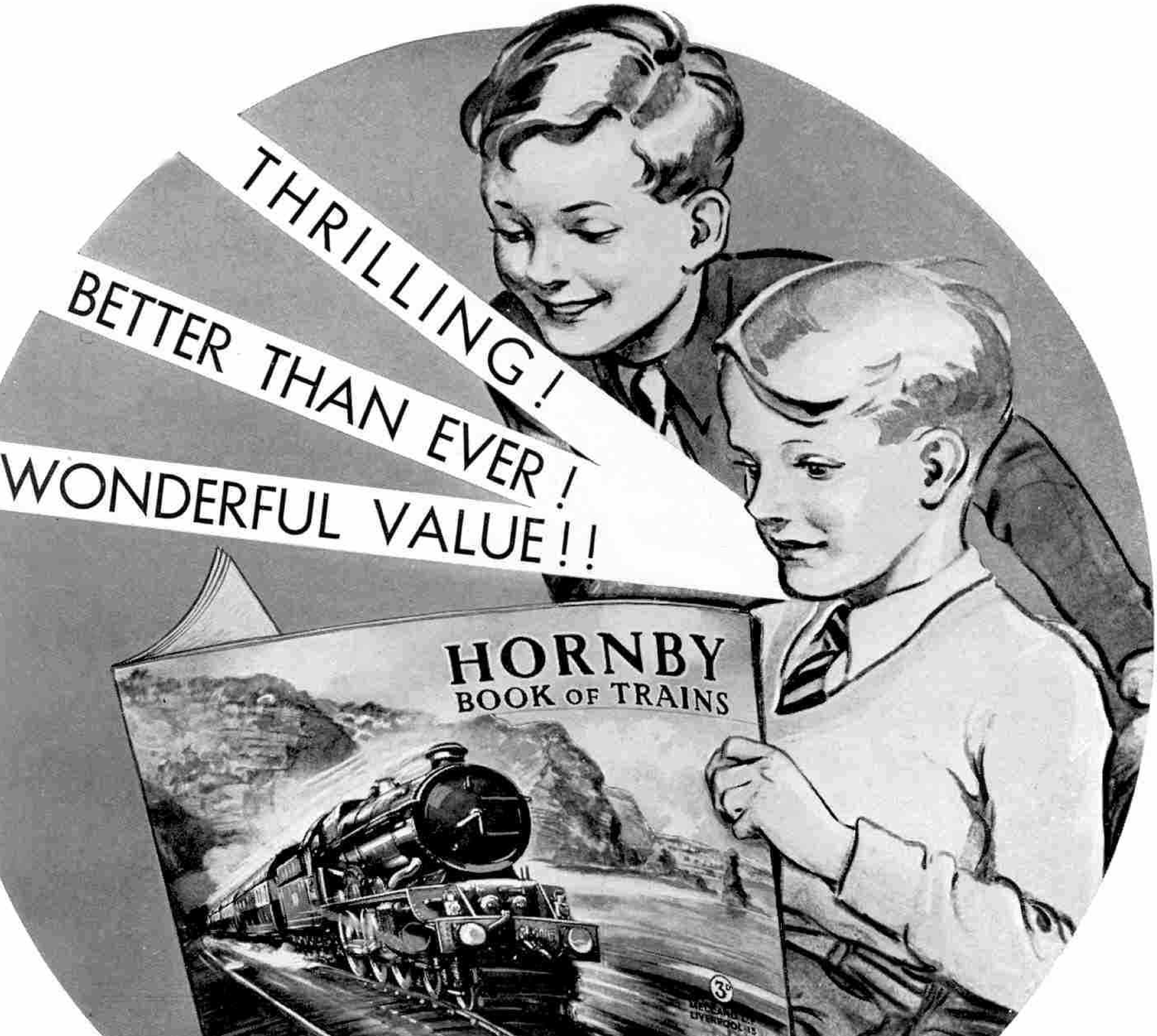
VOL. XXIII. No. 10. OCTOBER 1938

MECCANO MAGAZINE

LOADING COTTON AT NEW ORLEANS

6D.

THE 1938-9 HORNBY BOOK of TRAINS



The 1938-9 issue of the "Hornby Book of Trains" should be in the hands of every railway enthusiast.

The beautiful coloured cover shows a striking picture of the famous "*Cornish Riviera Limited*," specially painted by the well-known artist Bryan de Grineau. The contents of the Book are more varied than ever. They include articles, fully illustrated by splendid photographs, dealing with little-known features of railway goods traffic, automatic train control on the G.W.R., the famous L.N.E.R. and L.M.S. expresses on the London-Scotland routes, the mysteries of the Travelling Post Office, and the Continental Boat Trains of the Southern Railway.

In addition the Book forms a complete catalogue of Hornby Trains for electric and clockwork railways. All the Hornby Locomotives, Rolling Stock and Accessories are beautifully illustrated in full colour.

How to obtain the Book

The Hornby Book of Trains may be obtained from any Meccano dealer, price 3d., or direct from Meccano Ltd. (Dept. A.M.), Binns Road, Liverpool 13, price 4½d. post free. In the latter case a remittance in stamps should be sent and the name and address of the sender should be clearly written.

Readers living in Australia, New Zealand or South Africa who require copies should send their postal orders for 8d. (which includes postage) to the addresses given below. The Meccano Branch at Toronto will deal with Canadian orders and the price is 15 cents postpaid.

Readers living in countries other than those mentioned should order from Meccano Ltd., Binns Road, Liverpool 13, sending 6d. in stamps with their order.

3D.

AUSTRALIAN AGENTS: E. G. Page & Co., 52, Clarence St., Sydney (P.O. Box 1832k).
NEW ZEALAND AGENTS: Models Limited, Paykel's Buildings, Anzac Avenue, Auckland C.1 (P.O. Box 129).

SOUTH AFRICAN AGENT: Arthur E. Harris, 142, Market Street, Johannesburg (P.O. Box 1199).

CANADIAN BRANCH: Meccano Ltd., 187-189, Church Street, Toronto.

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RED, WHITE AND GREEN

Hamleys News

· HAMLEY · BROTHERS · LTD · ESTABLISHED · 1760 ·

200-202, REGENT ST., LONDON W.1. **OUR ONLY ADDRESS**
Telephone: REGENT 3161

No. 33 *October, 1938*

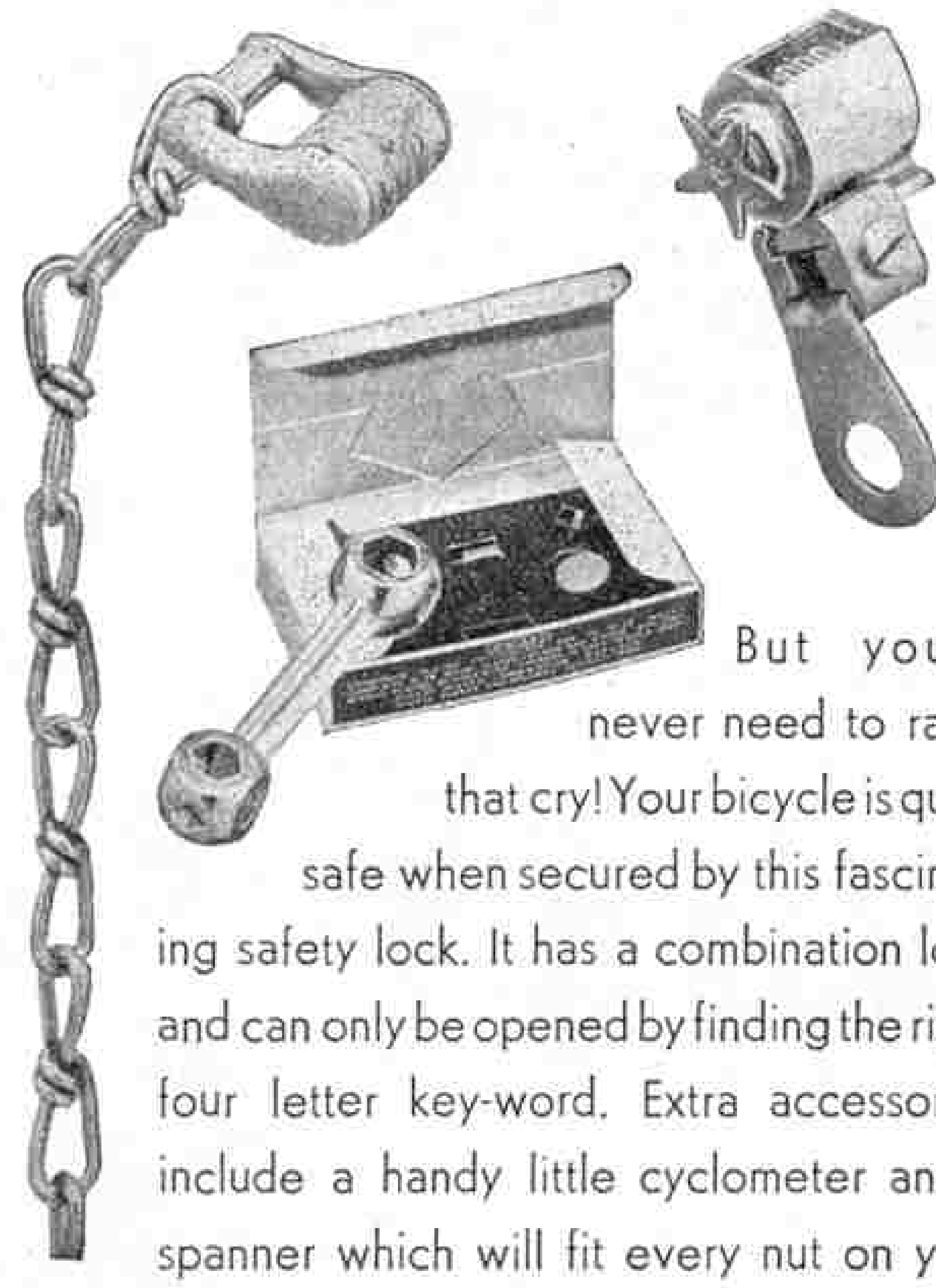
TOMMY'S SPEED RECORD BROKEN

THERE'S SPIES IN THEM THAR HILLS!!

No there aren't! It's only Tommy asking Jack to come over to tea to-morrow. You see, he uses the Three Colour Signalling Torch from Hamleys, and he and Jack have a code of their own. This torch has special green and red slides and, complete with battery and bulb, costs only

1/9 *(Foreign)* Post 3d.

STOP THIEF!



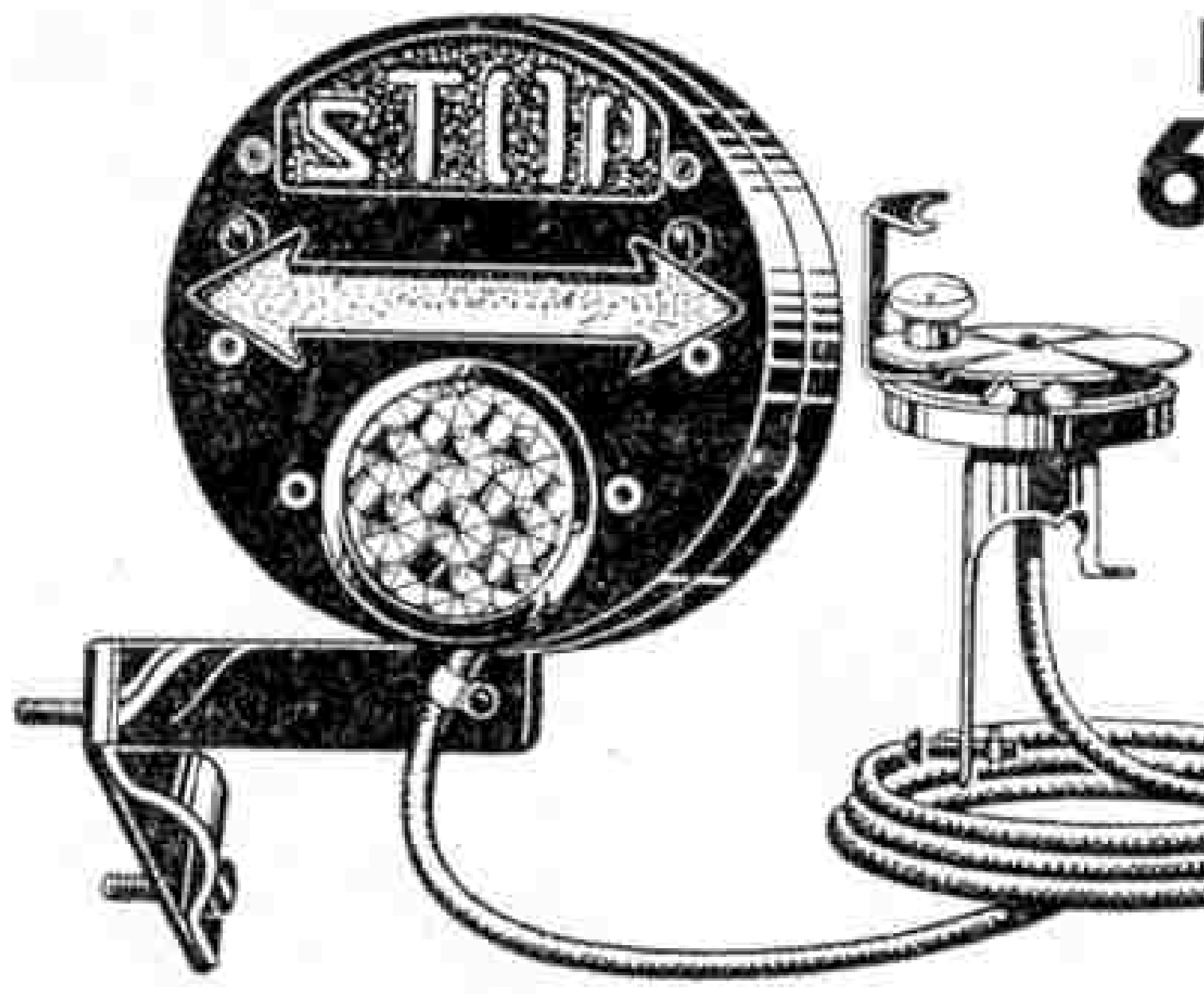
But you'll never need to raise that cry! Your bicycle is quite safe when secured by this fascinating safety lock. It has a combination lock and can only be opened by finding the right four letter key-word. Extra accessories include a handy little cyclometer and a spanner which will fit every nut on your bicycle. State 26" or 28" wheel.

Price **4/6** Post 3d.

357 MILES PER HOUR

Or maybe not quite as fast as that! But anyway you can always spot whether you've broken your **own** speed record with the aid of this grand speedometer. It tells you how far you've gone and it's easily attachable to your bicycle. Guaranteed accurate.

Price **19/6** Post 6d.



Price **6/4½** Post 4d.

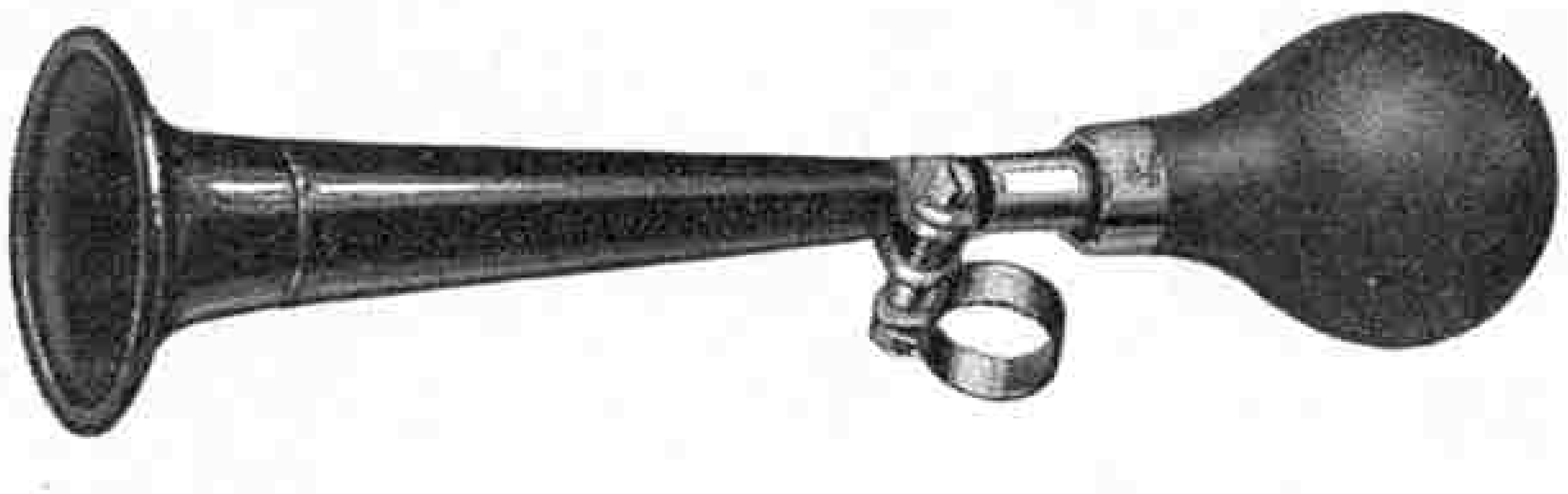
STOP PRESS

You can fit your bike like a car and give the correct signals. Though you can easily ride with one hand on the handlebars, it is safer nowadays to use the signal which, by the use of a switch, will automatically show which way you are turning and when you stop.

HOW FAR TO WARE?

You can find out how far it is to anywhere by the simple fixing of this compact little cyclometer to your bike. It'll give you valuable information as to the length of that long ride you've just done. Fits 26" and 28" wheel.

Price **2/6** Post 2d.



LOOK OUT!!

Here I come! And my bicycle horn clears the way for me like magic. Is invaluable in traffic.

Price **3/6** Post 4d.

WHERE'S THAT SCREWDRIVER?

You'll never say that if you've got one of these grand outfits which will meet every emergency. It's a complete pocket set with metal handle into which 7 tools fit, and fits into your pocket, too!

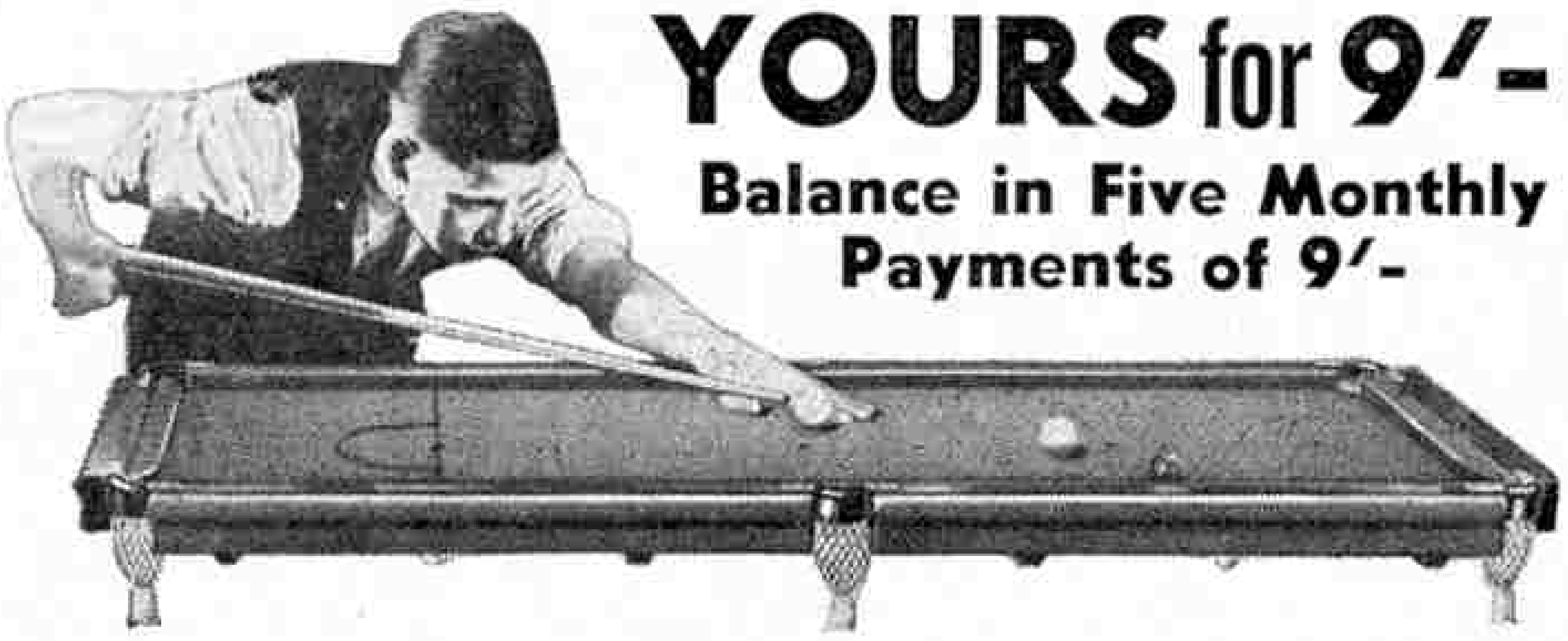
Price **2/9** *(Foreign)* Post 4d.

GAMAGES·

5 ft. MAHOGANY finished or OAK rail BILLIARD TABLE 49/6

YOURS for 9/-

Balance in Five Monthly Payments of 9/-



Just the Table for you chaps who want a good size, well made Billiard Table at home. Study this specification, it proves the value unequalled.

- **Best quality Laminated Bed, strongly battened to obviate warping.**
- **Solid Para Rubber Cushions.**
- **Bed and Cushions covered with excellent quality English Woven Cloth.**
- **Brassed Pocket Plates, leather covered and fitted Cord Pocket Nets.**
- **Adjustable rubber covered feet for levelling table.**
- **Each Table is supplied complete with the following accessories: Set of 3 guaranteed turned composition 1½ in. Billiard Balls. Two 4 ft. Cues. Large Marking Board, fitted with brass runners and pointers. Chalk and Book of Rules.**

Overall Size of Table 5 ft. 4 in. by 2 ft. 9 in., giving a full 5 ft. playing surface.

With 16/6 SNOOKER SET £3-6-0 or 9 Monthly Payments of 8/-.

Please state whether Mahogany finish or Oak.

Stand for this Table 29/6 extra.

Carriage outside our extensive delivery area 2/6 England or Wales.

Britain's Leading House for Billiards and Table Tennis

TABLE TENNIS TOPS

Not to be confused with cheap plywood tops at similar prices

Well made from selected ⅜ in. reinforced Birch, ensuring a perfect playing surface, without "dead spots." The under battening is of 1½ in. by ⅞ in. material, practically obviating warping. Made in two sections for folding.

The 32/6 Table is Tournament Size, finished in Green, with Association ¾ in. White Line.

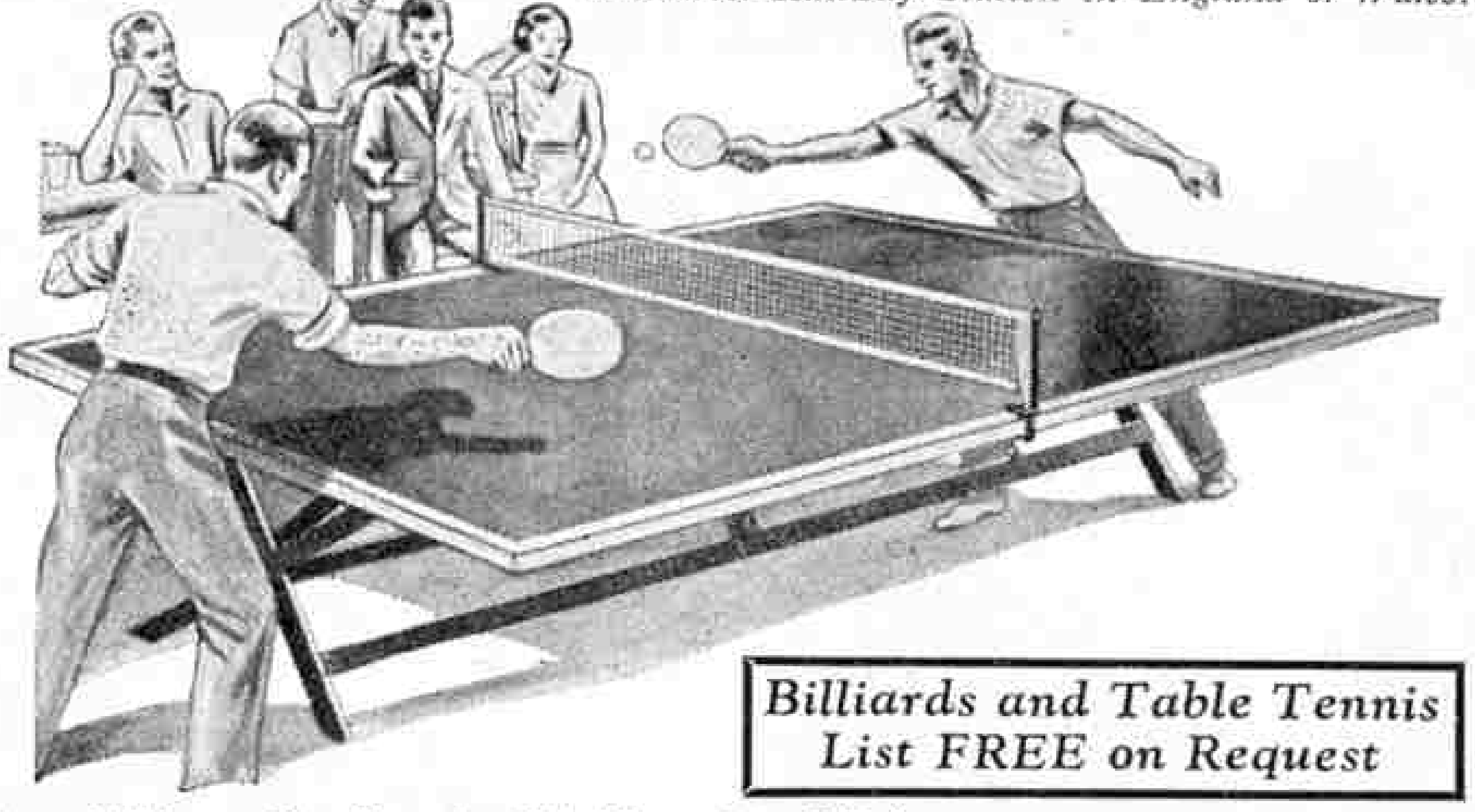
8 ft. by 4 ft. 25/-
Carriage England or Wales, 1/6.

9 ft. by 5 ft. 32/6
Carriage England or Wales, 1/6.

Full Size Tournament Table (9 ft. by 5 ft.) complete with Trestle, 51/- Or 9 Monthly Payments of 6/3.

Superior 6 ft. 6 in. Trestle, in one piece. Folds flat. 18/6.

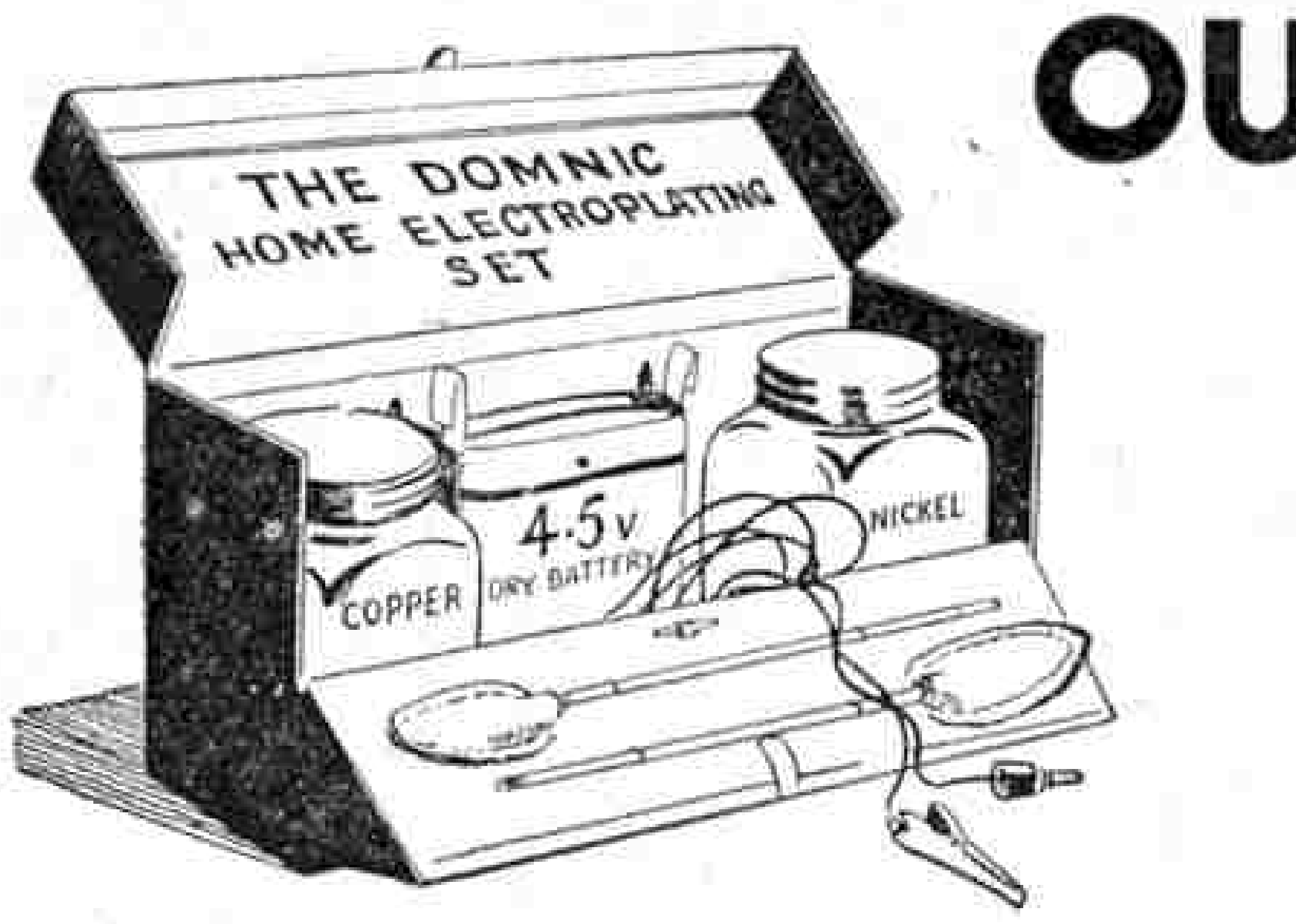
If Top and Trestle ordered together, we pay carriage to nearest Railway Station in England or Wales.



Billiards and Table Tennis List FREE on Request

GAMAGES, HOLBORN, LONDON E.C.1. 'Phone HOLborn 8484. City Branch: 107, Cheapside, E.C.2

GENUINE ELECTROPLATING OUTFIT


THE DOMNIC HOME ELECTROPLATING SET
4·5v DRY BATTERY
COPPER
NICKEL

6/9 POST FREE

Safe, easy and simple to operate, no fuss or bother, follow the simple instructions and you will be amazed at the result. Brighten up your home, plate your taps, door handles, fittings, etc., without removing. Add to the pleasure of making Meccano Models by electroplating the various parts.

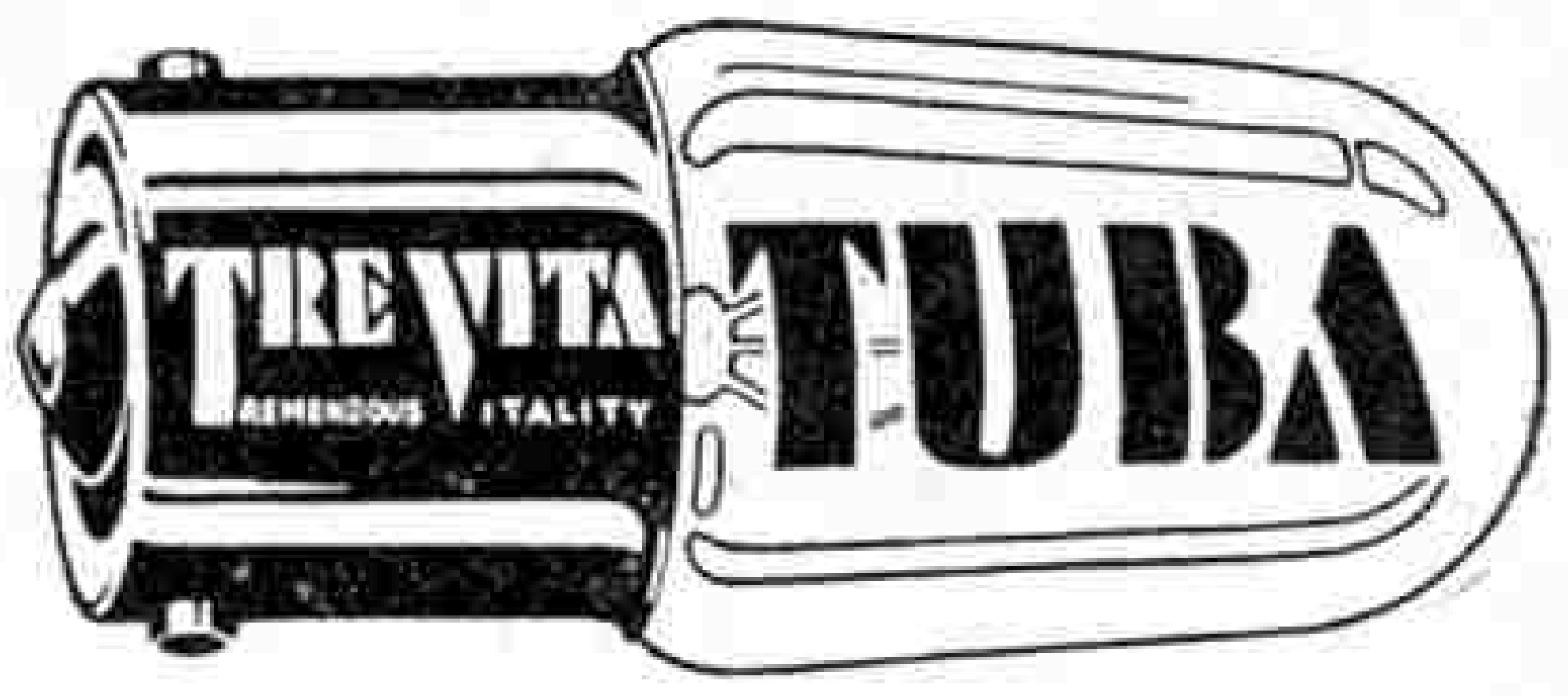
This is not an applied polish but a perfect Electroplating Process. Metal is definitely electrically deposited. Not a toy but a scientific apparatus devised by experts and is permanent. Immense scope for the ingenious mind.

Packed in neat case with full instructions, Post free 6/9, from

DOMNIC PRODUCTS LTD.

Dept. (M.M.) 19, Campbell Rd., West Croydon

and from all the Principal Stores



When used with your 6v 3w Cycle Dynamo gives you:

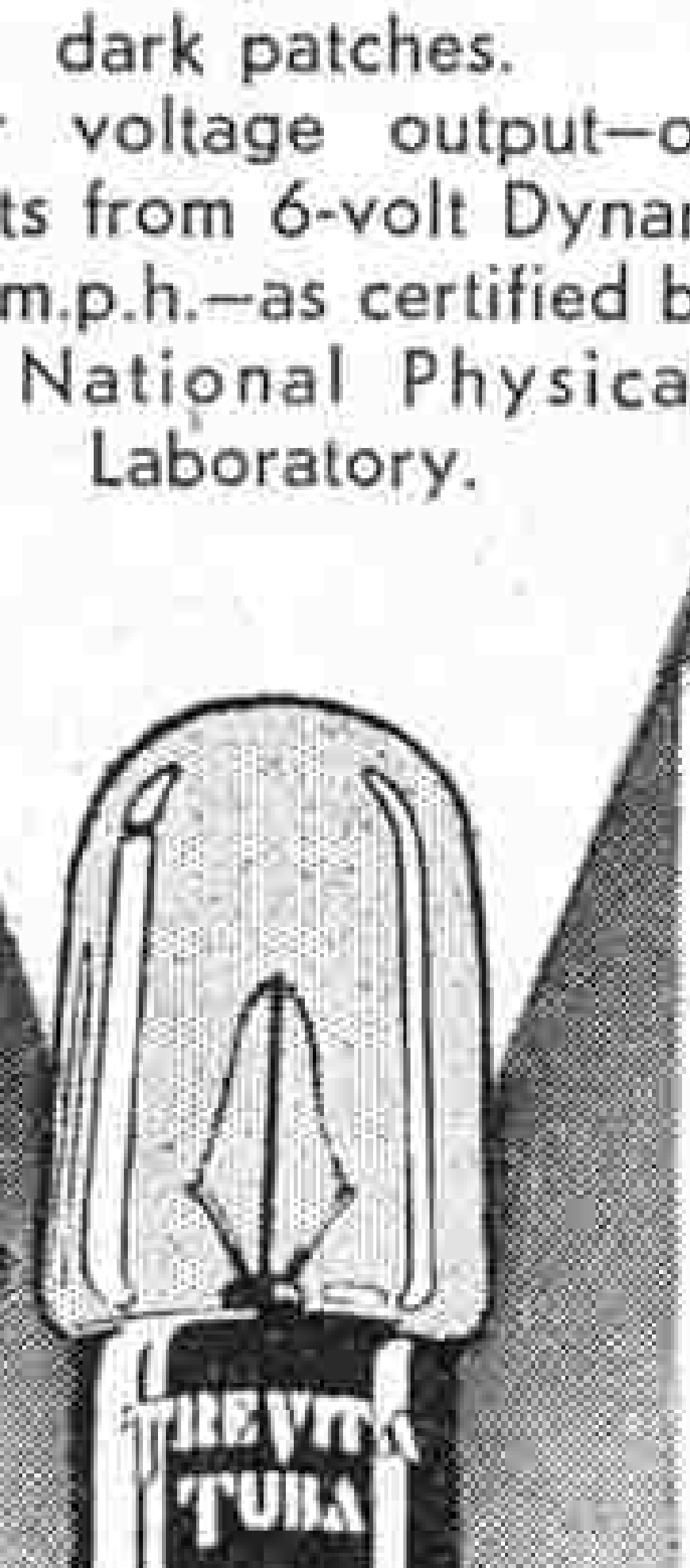
An efficient light at walking speed, when with the usual Bulb there is no light.
A broad light illuminating the whole road—both immediately in front, sides, far ahead, and without any dark patches.
Greater voltage output—over 13 volts from 6-volt Dynamo at 15 m.p.h.—as certified by the National Physical Laboratory.

For use with Lucas
LSF—Silk Frosted **1/-**
LSC—Clear **11d.**

For use with Miller
MSF—Silk Frosted **1/-**
MSC—Clear **11d.**

For use with Seeco
SSF—Silk Frosted **1/-**
SSC—Clear **11d.**

For rear therewith use Tre Vita, ref. 194 6V.04A.

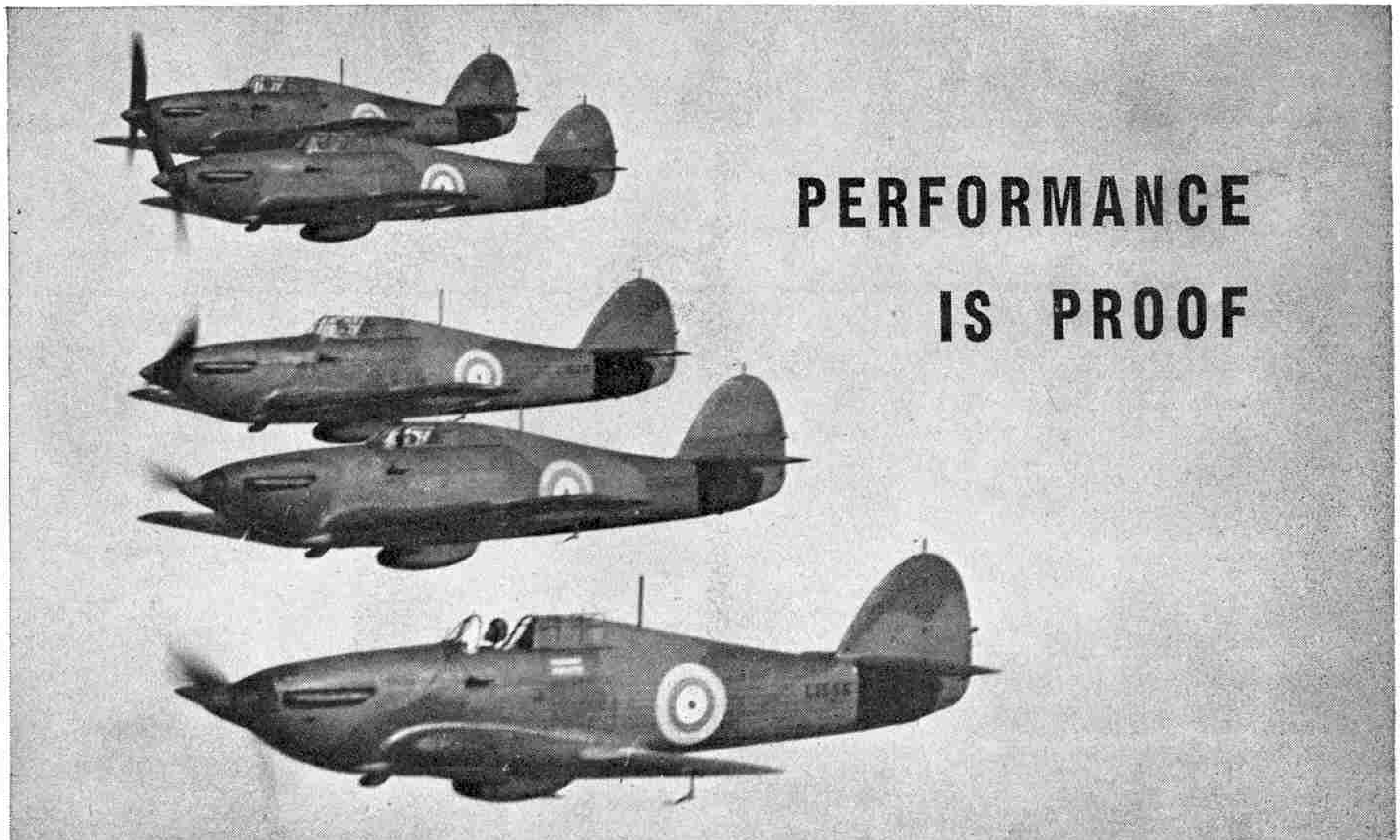


Send for 1938 Catalogue (post free) fully describing the Tre Vita Tuba, and other improvements for the coming season in Bulbs for Cycle Lamps.

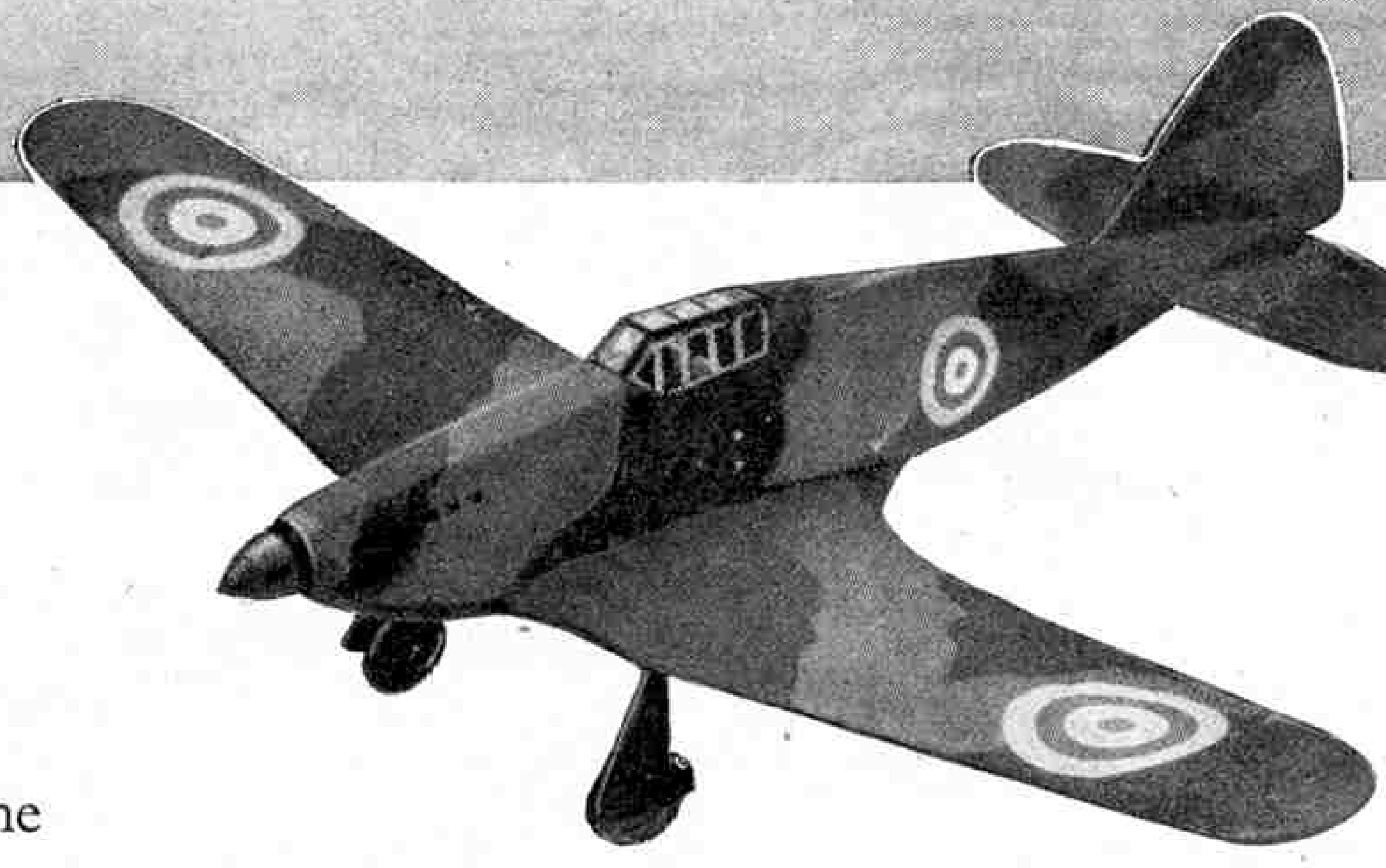
Obtainable from leading cycle dealers or post free direct.

VITALITY BULBS
(Props: Wartburg Lamps Ltd.)

RYLAND ROAD
LONDON, N.W.5



PERFORMANCE IS PROOF



• HAWKER HURRICANE **1/6**

The correctness of aircraft design is measured by performance. The FROG constructor kits enable the enthusiast to build a model with both high performance and excellent appearance. Constructor kits from 1/6 to 21/-. See them at your local toyshop or post the coupon below.

NO TOOLS REQUIRED · ALL PARTS CUT TO SHAPE · INSTRUCTIONS EASY TO FOLLOW · EXCELLENT PERFORMANCE

FROG **MODEL AIRCRAFT**

Covered by World Patents granted and pending.
Made in England by International Model Aircraft Ltd.

OBTAINABLE AT ALL GOOD TOYSHOPS AND STORES Sole Concessionaires:
LINES BROS. LTD., MORDEN ROAD, MERTON, S.W.19

FROG Trade Mark Regd.

COUPON *Please send me your "Frog" coloured leaflet with particulars of the "Frog" Flying Club and how to obtain handsome enamelled "Frog" Pilot badges.*

To Lines Bros. Ltd. (Dept. 5),
Morden Road, London, S.W.19

NAME..........

ADDRESS..........

PLEASE WRITE IN BLOCK LETTERS 10/38

PERFECT SCALE MODELS

DINKY TOYS

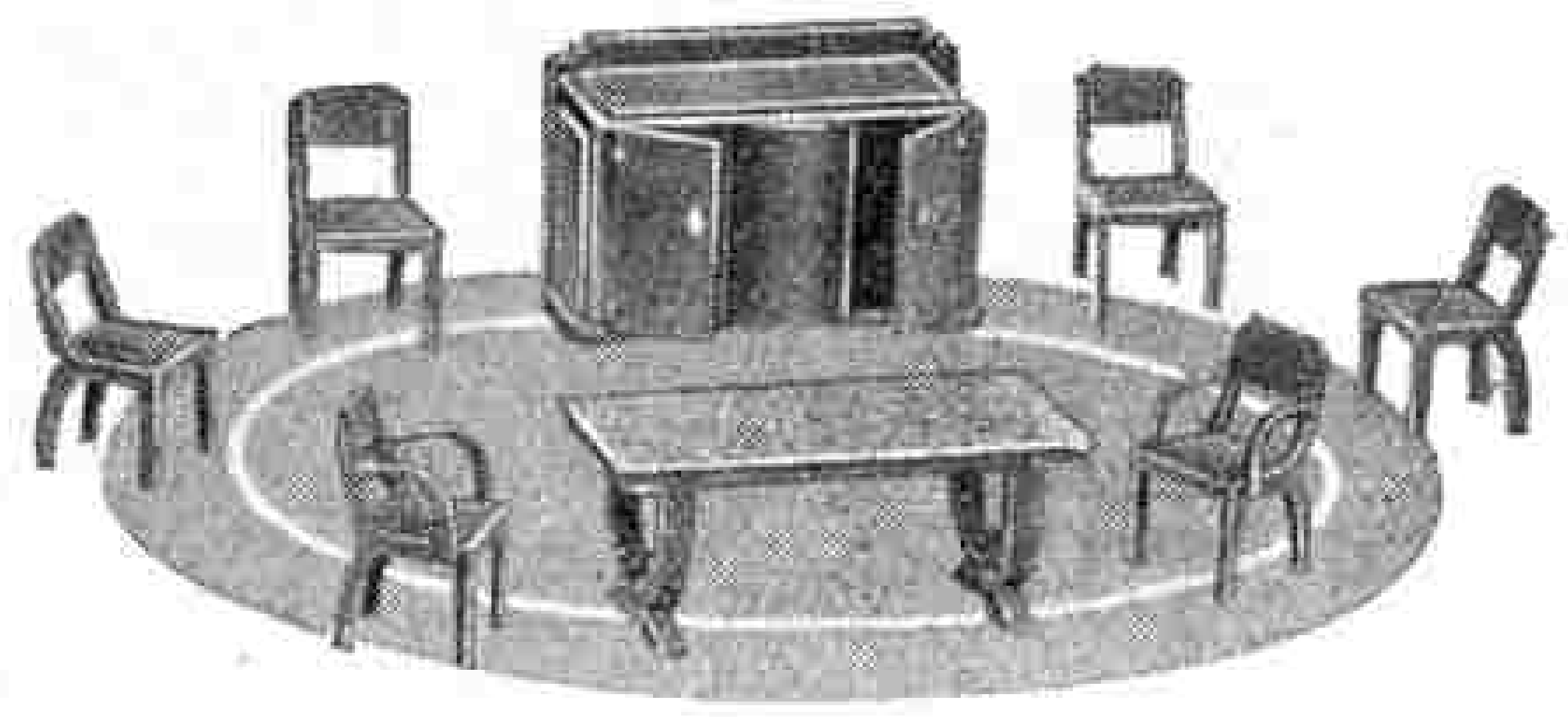
OVER 300 VARIETIES

Collecting Dinky Toys is one of the most fascinating of all hobbies. These realistic miniatures are unique in their rich colouring and perfection of design and finish, and their range is so wide as to appeal to all tastes. This season many new items have been introduced including wonderful scale models of military Tanks and Aeroplanes, latest types of Motor Cars, complete with driver and passenger, and many others.

Every boy or girl who has not already done so should start this delightful collecting hobby to-day. All the models can be purchased either separately or in complete sets.

DOLL'S HOUSE FURNITURE. We draw special attention to the fact that we have found it possible to reduce the prices of these popular Dinky Toys.

DINING-ROOM FURNITURE



Dinky Toys No. 101 Price of complete set **1/9**

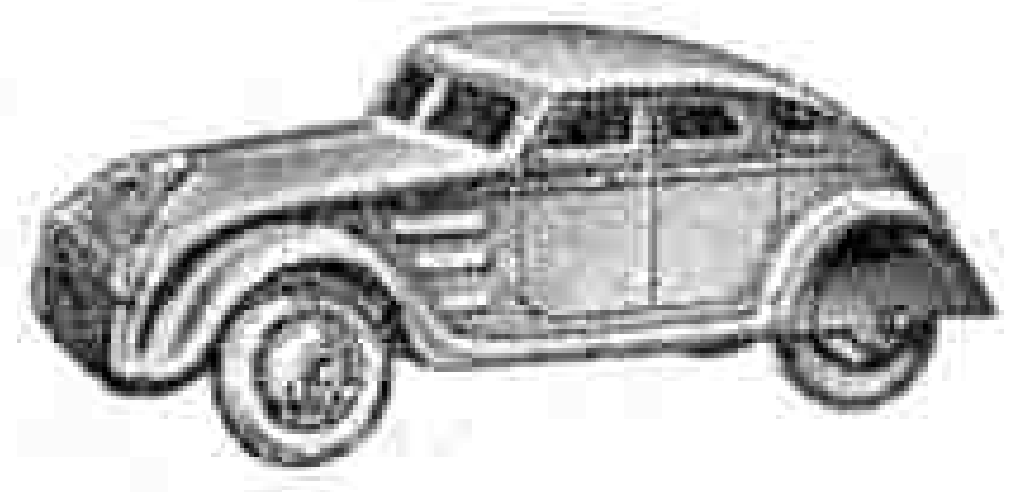
No. 101a Table	**4d.** each
No. 101b Sideboard (Opening doors)... ...	**7d.** ,,
No. 101c Carver Chairs (2)	**2½d.** ,,
No. 101d Chairs (4)	**1½d.** ,,

Supplied in walnut brown finish only.

MOTOR TRUCK

Dinky Toys No. 22c
Assorted colours. Fitted with detachable rubber tyres.
Price **6d.** each

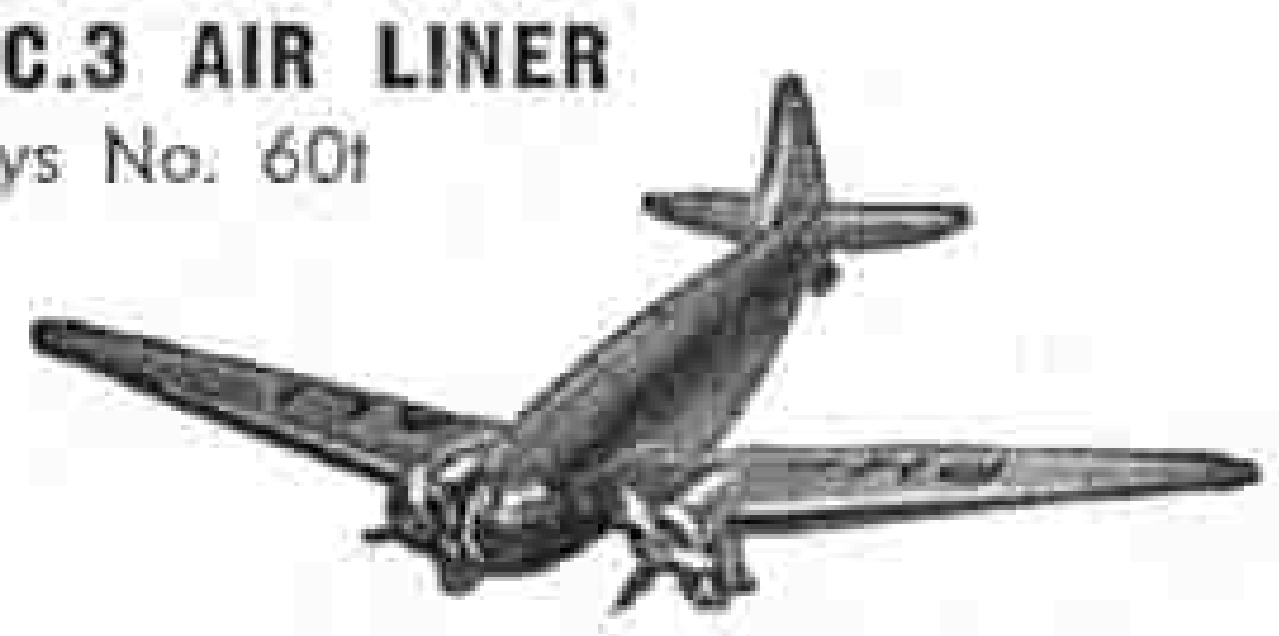
STREAMLINE SALOON



Dinky Toys No. 22h
Assorted colours. Fitted with detachable rubber tyres.
Price **4d.** each

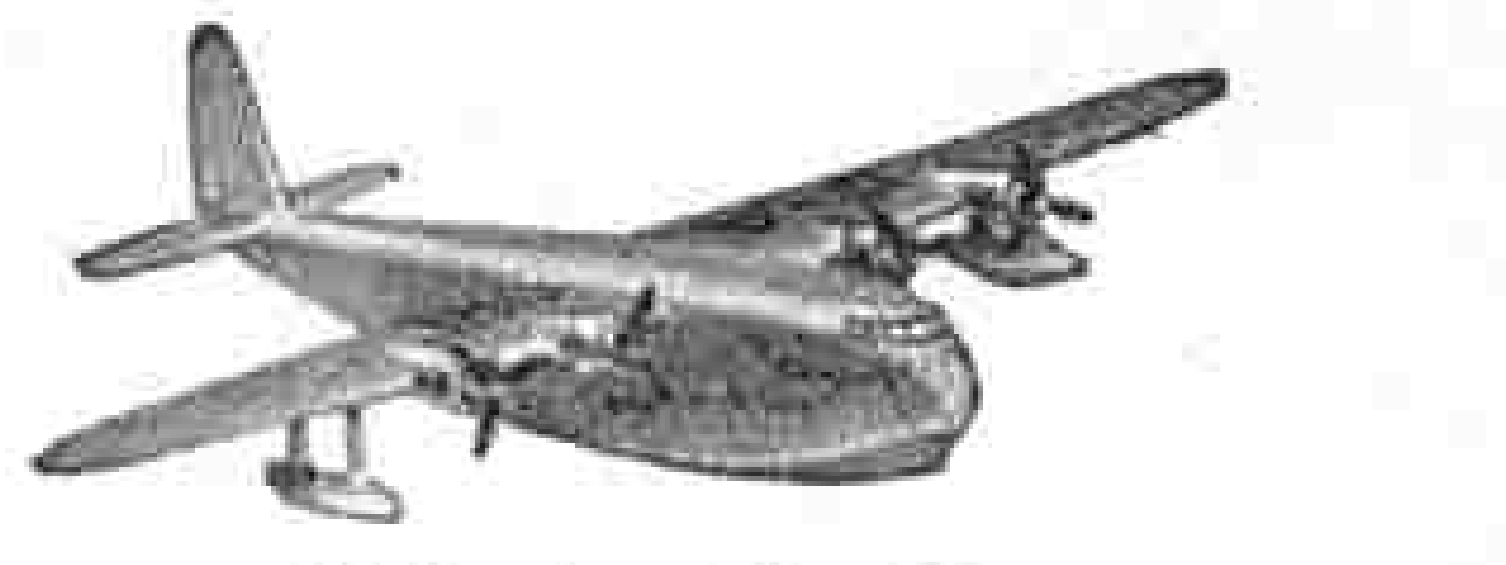
DOUGLAS D.C.3 AIR LINER

Dinky Toys No. 60t



A scale model of a Douglas D.C.3 air liner, a type in regular service on American and European routes.
Price **9d.** each

EMPIRE FLYING BOATS



Dinky Toys No. 60r

Scale models of the latest Imperial Airways Flying Boats. Twelve models available named: *"Caledonia," "Canopus," "Corsair," "Challenger," "Centurion," "Cambria," "Calpurnia," "Ceres," "Clio," "Calypso," "Corinna"* and *"Cheviot."* Price **1/-** each

ATLANTIC FLYING BOAT

Dinky Toys No. 60x

Similar in type to the Empire Flying Boat. Assorted colours.
Price **1/-** each

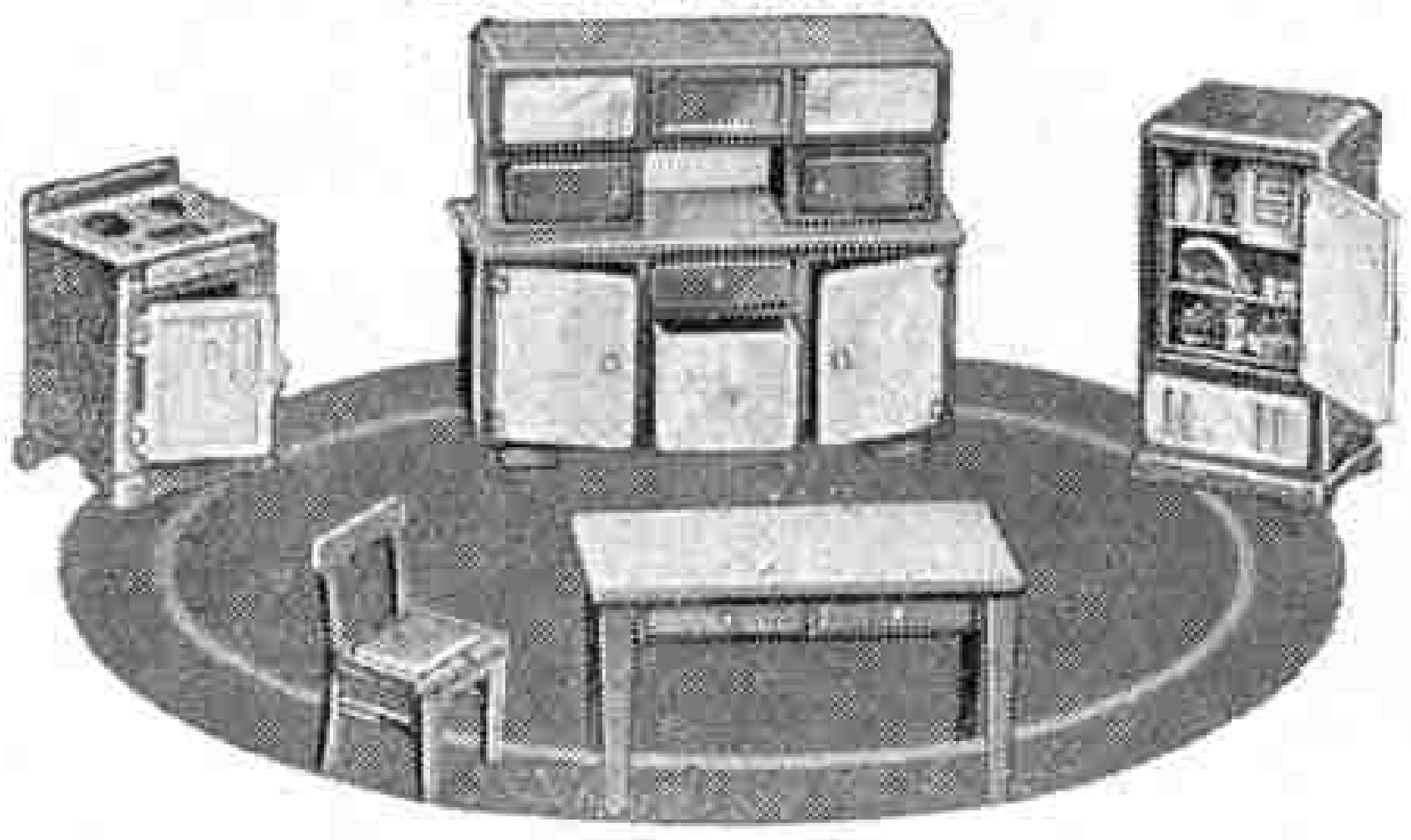
AEROPLANES

Dinky Toys No. 60z

The set consists of six models of famous French aeroplanes—"Arc-en-Ciel," Potez 58, Hanriot H180T, Breguet-Corsaire low wing monoplane, Dewoitine 500 and Cierva Autogiro. (Made in the Meccano Factory in Paris.) Price **3/-**

MONOPLANE "ARC-EN-CIEL." Dinky Toys No. 60az
A Scale model of the famous French triple-engined monoplane "Arc-en-Ciel." (Made in the Meccano Factory in Paris.) Price **9d.** each

KITCHEN FURNITURE



Dinky Toys No. 103 Price of complete set **2/-**

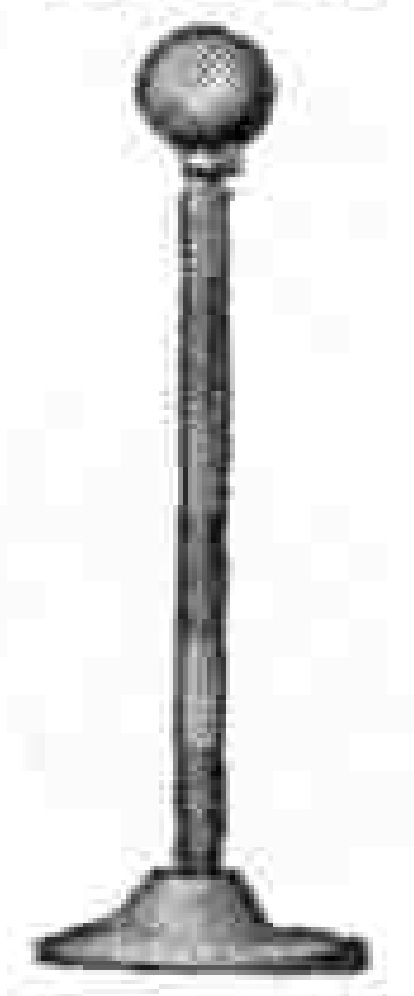
No. 103a Refrigerator (Opening door) ...	**6½d.** each
No. 103b Kitchen Cabinet (Opening doors and drawer)	**8d.** ,,
No. 103c Electric Cooker (Opening door) ...	**5d.** ,,
No. 103d Table	**3½d.** ,,
No. 103e Chair	**1½d.** ,,

Supplied in two colour schemes—light blue and white; light green and cream.

REFUELLING TENDER

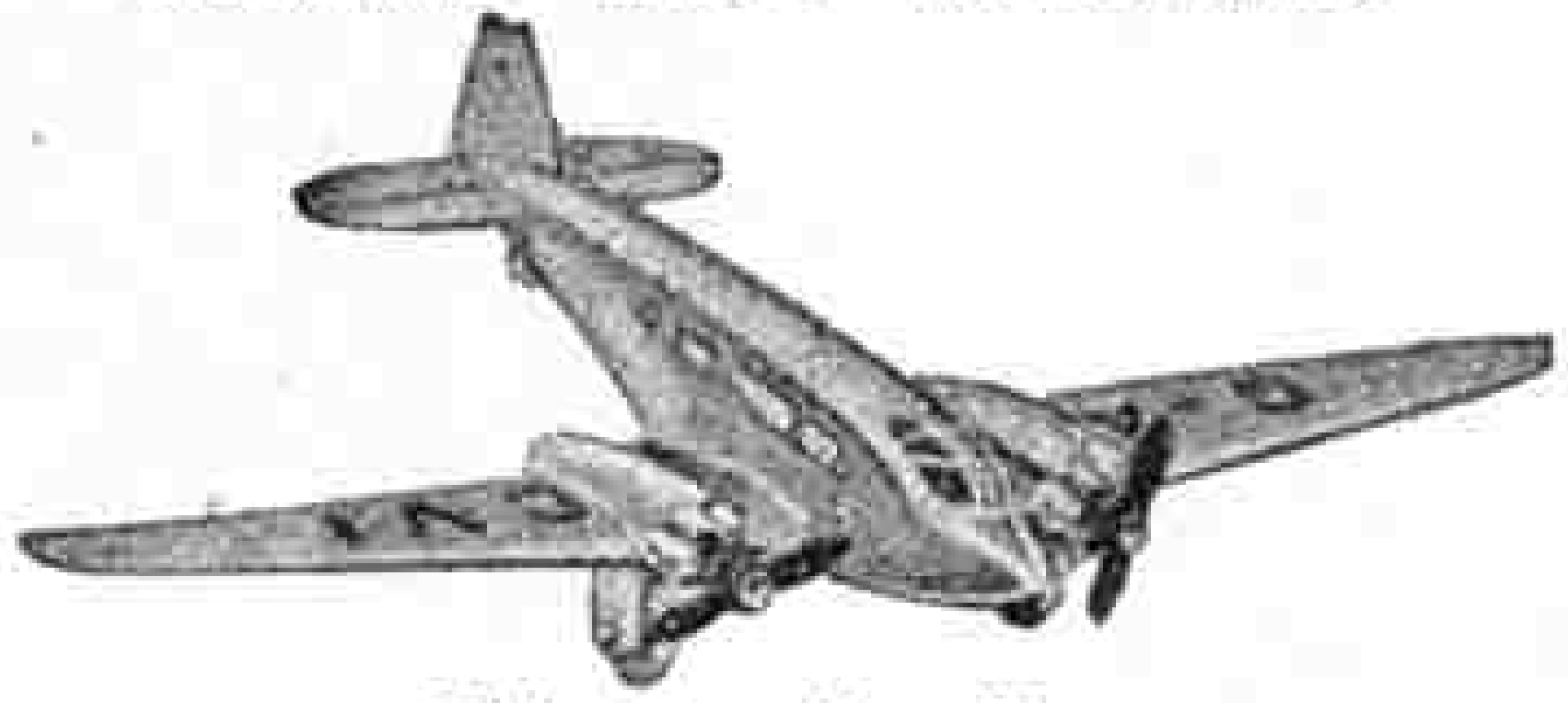
Dinky Toys No. 60y
Realistic model of Thompson Bros. Tender used for refuelling aeroplanes at aerodromes.
Price **8d.** each

BEACON



Dinky Toys No. 47d
Realistic model of the Belisha Safety Beacon.
Price **1d.** each

AIRSPEED "ENVOY" MONOPLANE

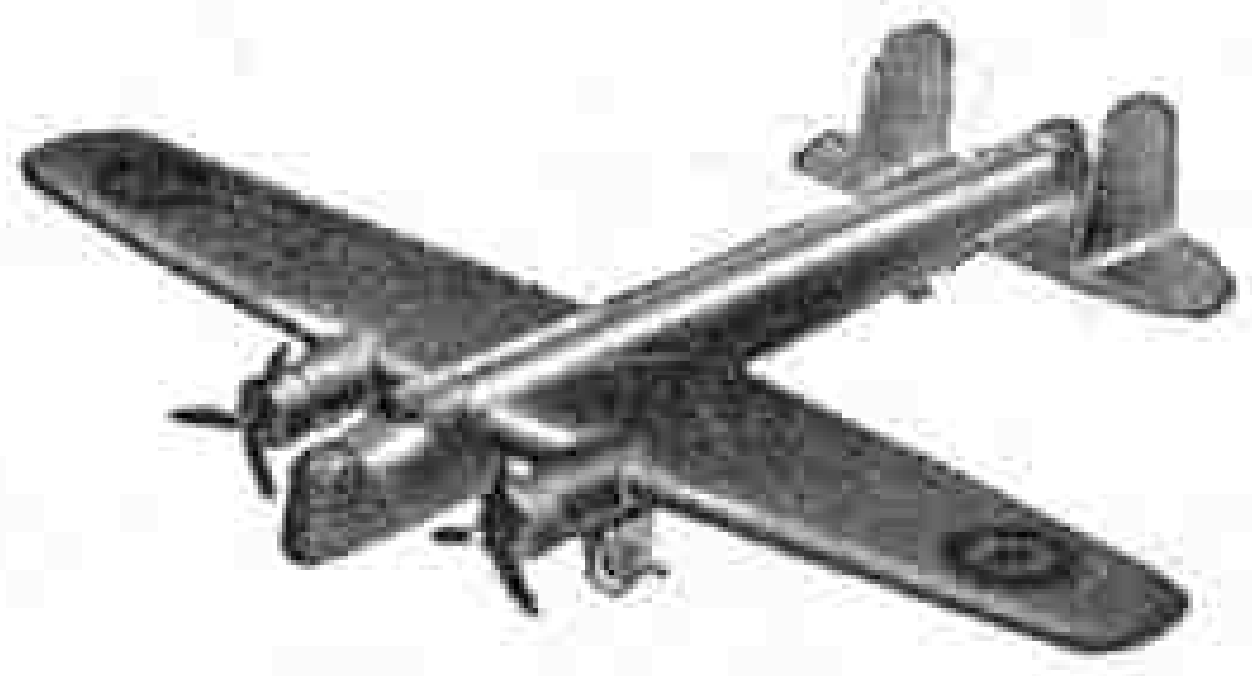


Dinky Toys No. 62m
Scale model of the Airspeed "Envoy" twin engined commercial monoplane. Assorted colours. Price **6d.** each

THE KING'S AEROPLANE

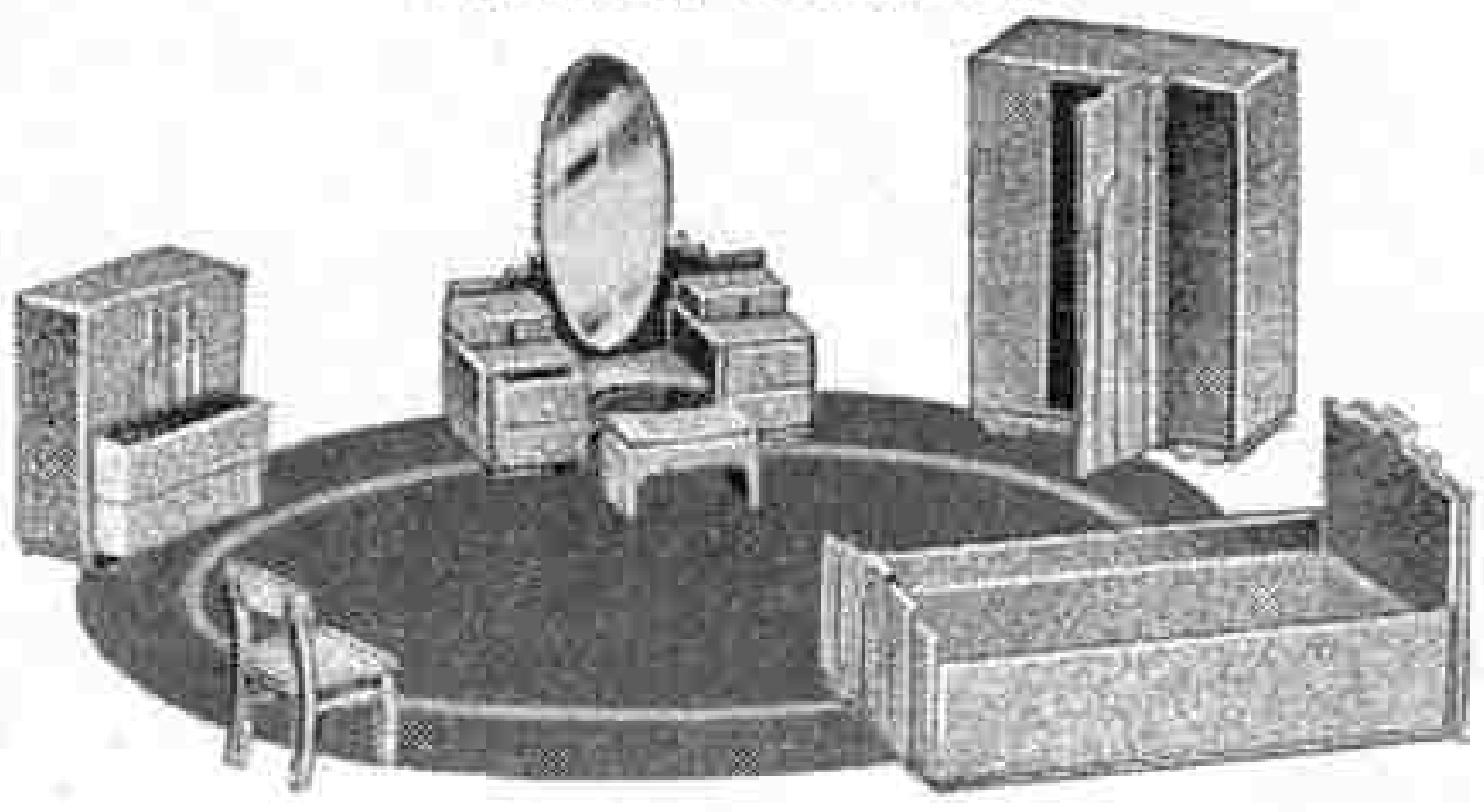
Dinky Toys No. 62k
Scale model of the Airspeed "Envoy" supplied to the Air Council for the King's Flight.
Price **8d.** each

ARMSTRONG WHITWORTH "WHITLEY" BOMBER



Dinky Toys No. 60v
Scale model of the "Whitley" long-range heavy bomber adopted by the R.A.F.
Price **9d.** each

BEDROOM FURNITURE

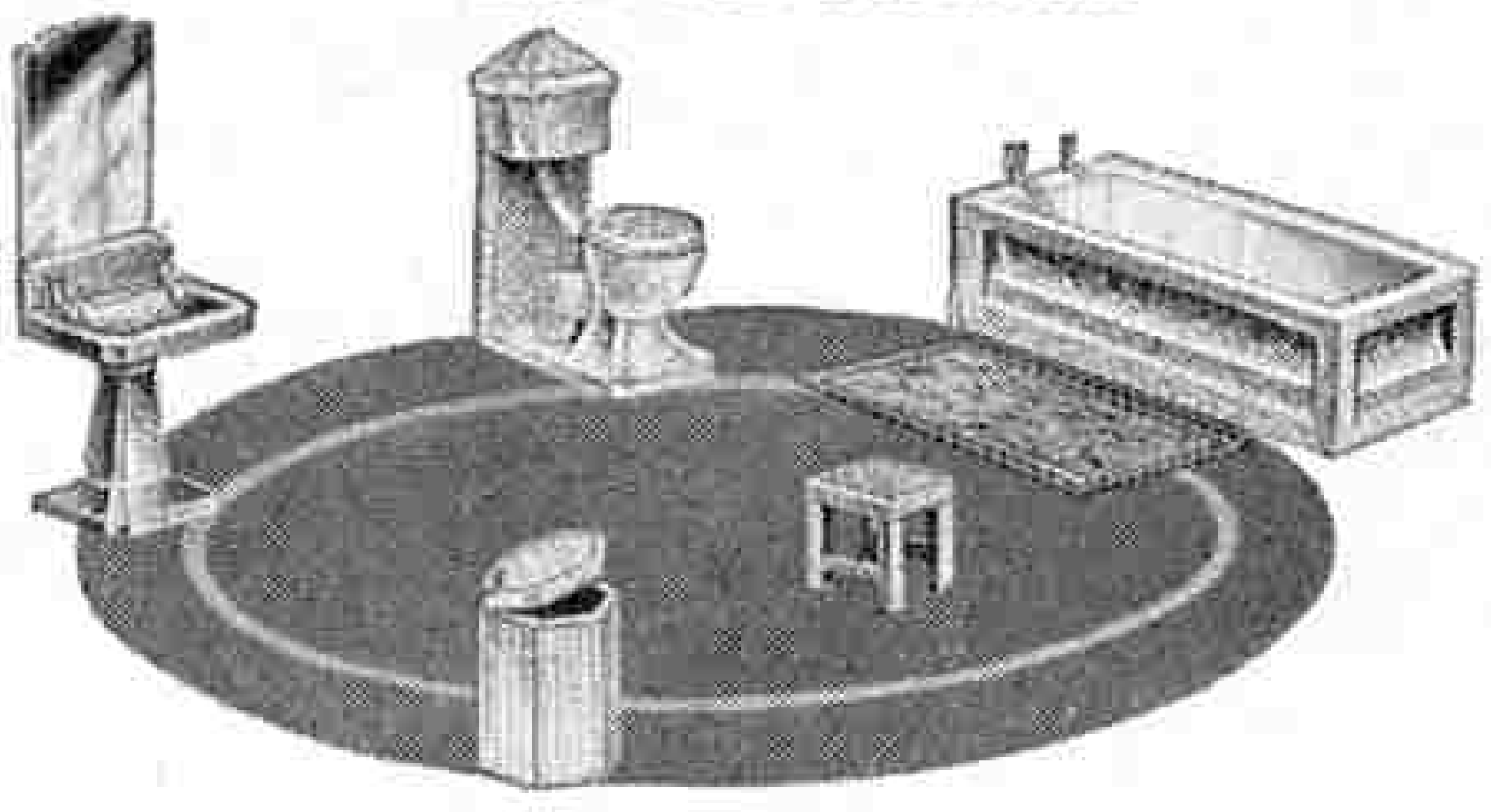


Dinky Toys No. 102 Price of complete set **2/3**

No. 102a Bed	**5d.** each
No. 102b Wardrobe (Opening door)	**7d.** ,,
No. 102c Dressing Table (Opening drawers)...	**8d.** ,,
No. 102d Dressing Chest (Opening drawers)...	**5d.** ,,
No. 102e Dressing Table Stool	**1½d.** ,,
No. 102f Chair	**1½d.** ,,

Supplied in colour or walnut brown finish.

BATHROOM FURNITURE

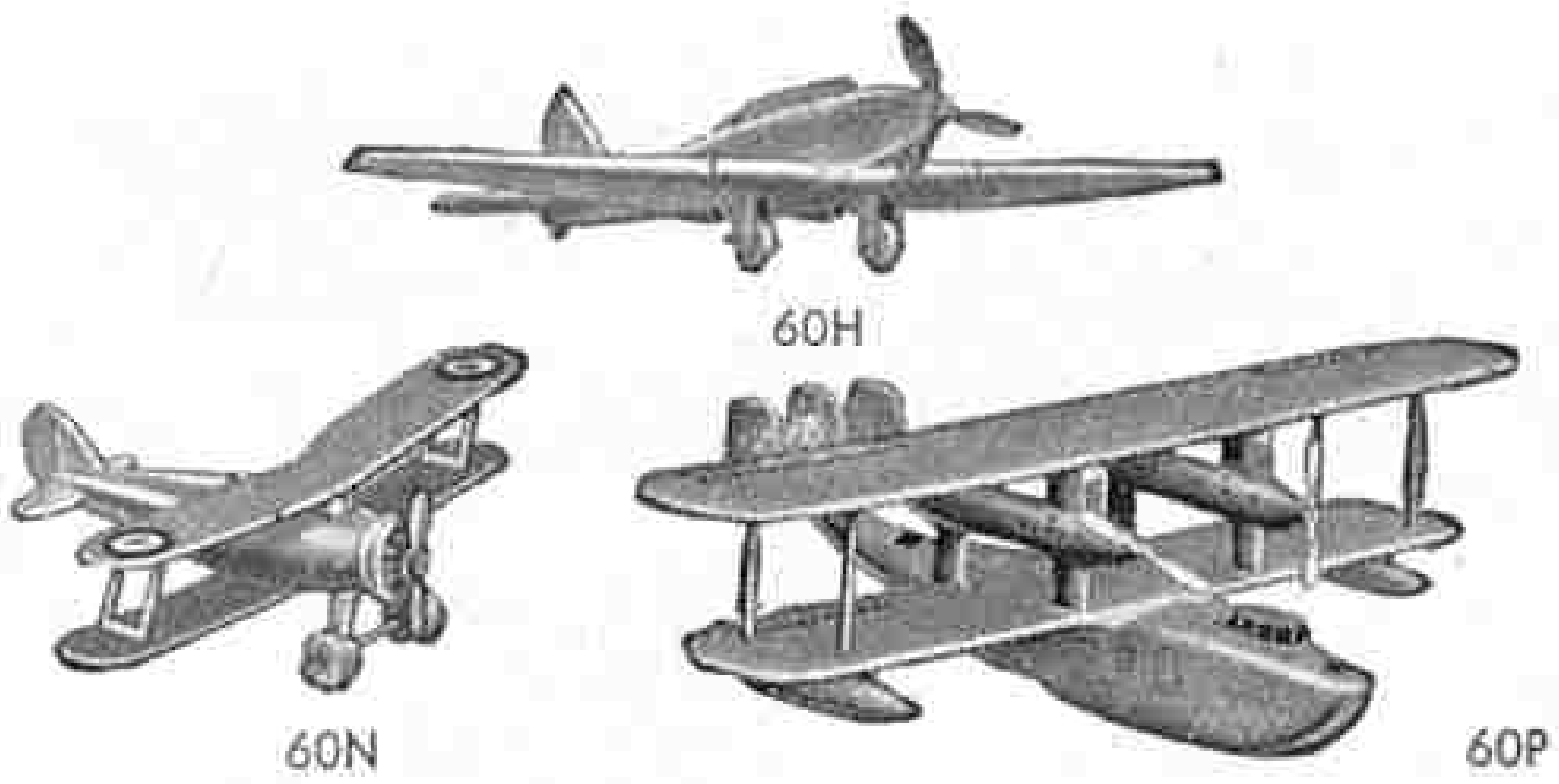


Dinky Toys No. 104 Price of complete set **1/6**

No. 104a Bath	**4½d.** each
No. 104b Bath Mat	**½d.** each
No. 104c Pedestal Hand Basin	**4½d.** ,,
No. 104d Stool	**1½d.** ,,
No. 104e Linen Basket (Opening Lid) ...	**3d.** ,,
No. 104f Toilet (Lifting Lid)	**4½d.** ,,

Supplied in two colour schemes—pink and white; light green and white.

R.A.F. AEROPLANES



Dinky Toys No. 61

No. 60h "Singapore" Flying Boat	each **1/-**
No. 60n Fairey "Battle" Bomber (2)...	,, **4½d.**
No. 60p Gloster "Gladiator" Biplane (2)	,, **6d.**

Price of complete set **2/9**

FLYING BOAT "CLIPPER III"

Dinky Toys No. 60w
Scale model of the Pan American Airways flying boat that took part in the transatlantic experimental flights in 1937
Price **1/-** each

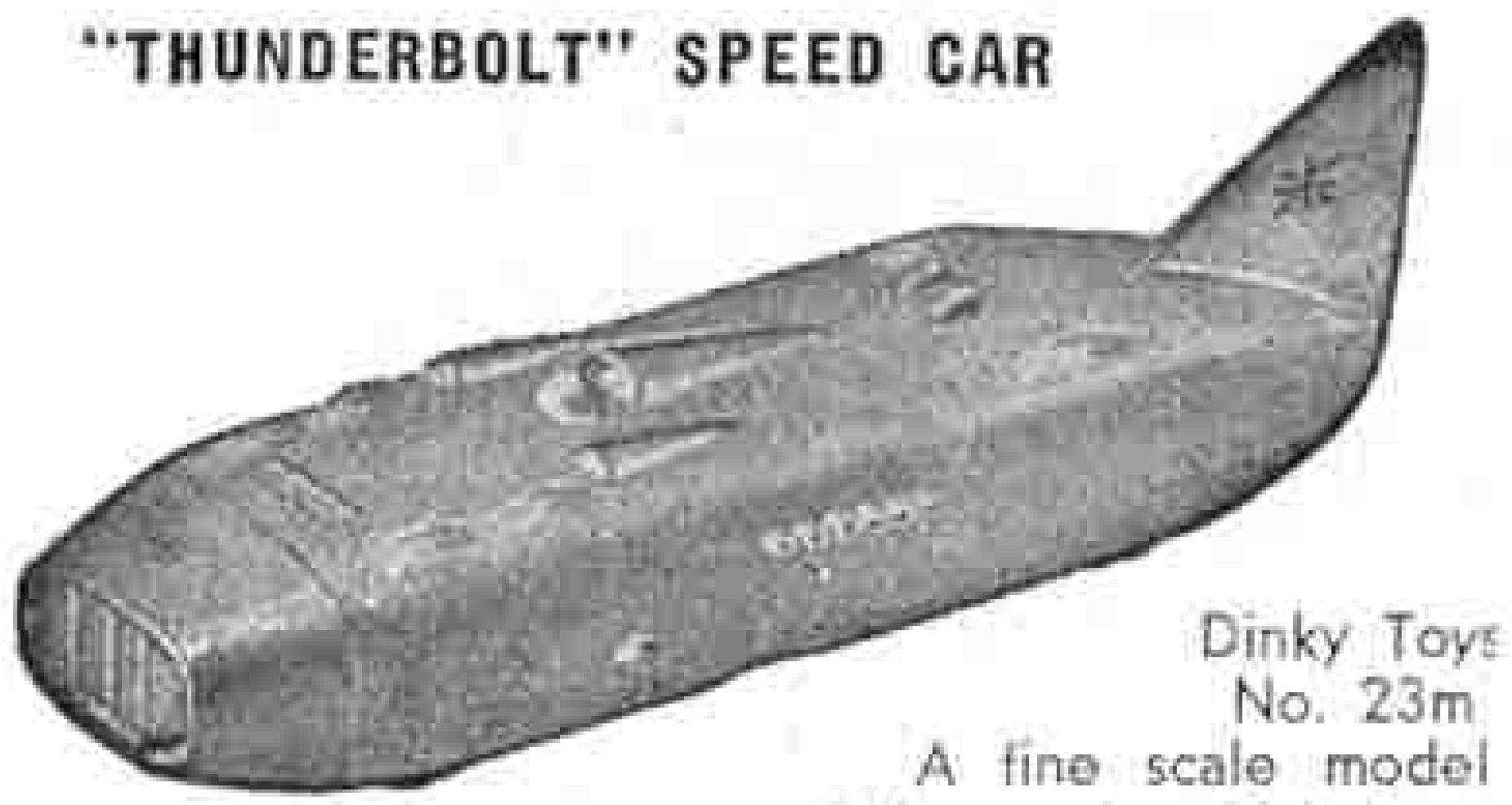
MECCANO LIMITED — BINNS ROAD — LIVERPOOL 13

A FASCINATING COLLECTING HOBBY

DINKY TOYS

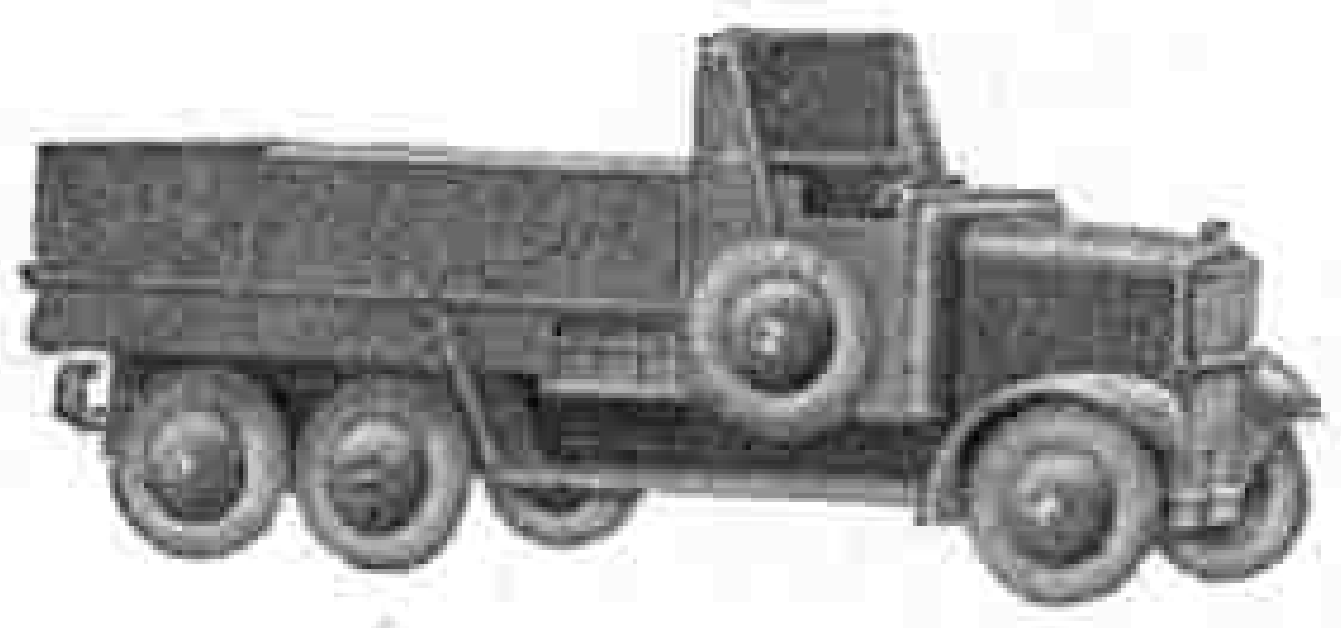
FINISHED IN RICH COLOURS

"THUNDERBOLT" SPEED CAR



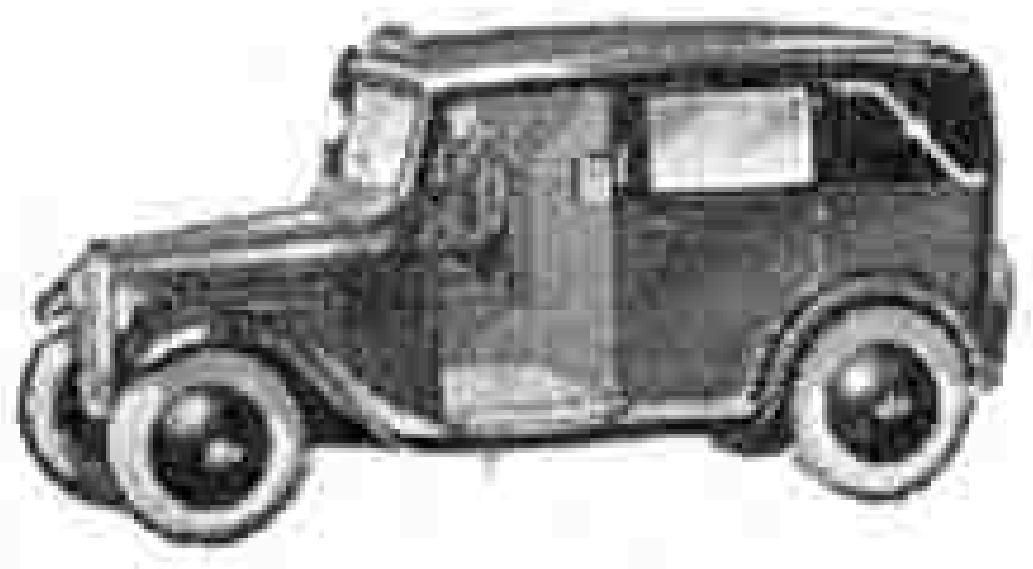
Dinky Toys No. 23m
A fine scale model of the car in which Capt. G. E. T. Eyston set up a world land speed record of 357.50 m.p.h. at Bonneville, Utah, U.S.A., recently. Price **1/-** each

SIX WHEELED WAGON



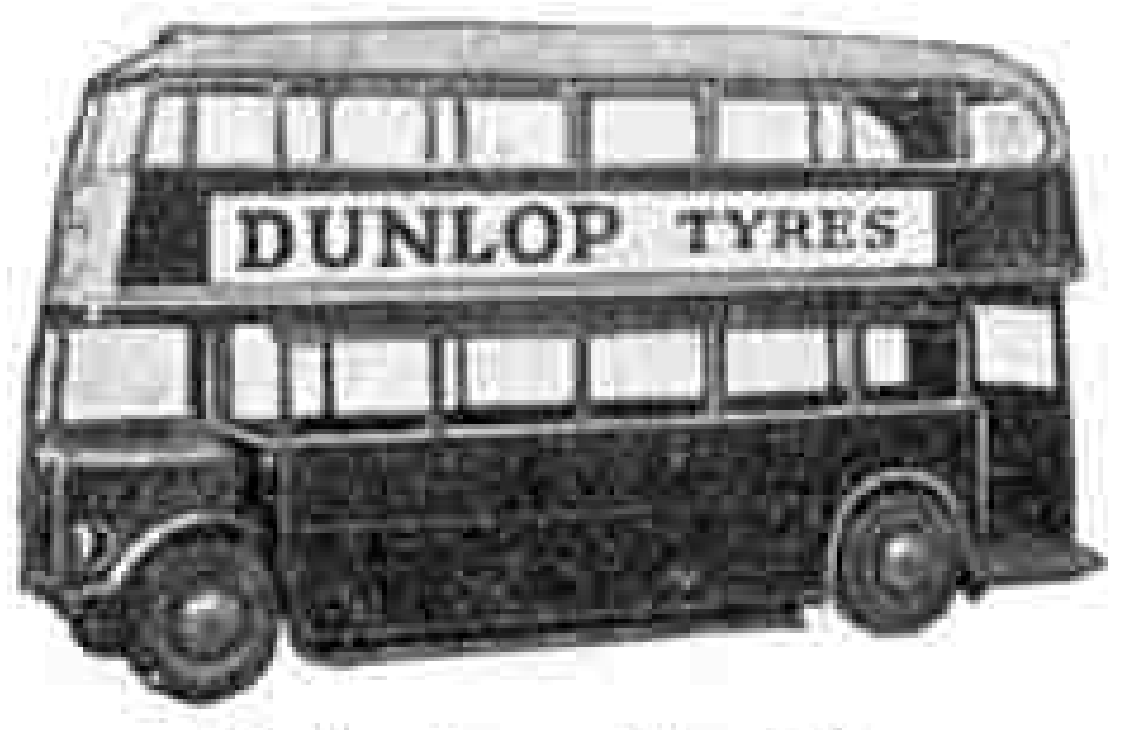
Dinky Toys No. 25s
An interesting model of a modern three-ton wagon. In assorted colours.
Price **1/-** each

TAXI WITH DRIVER



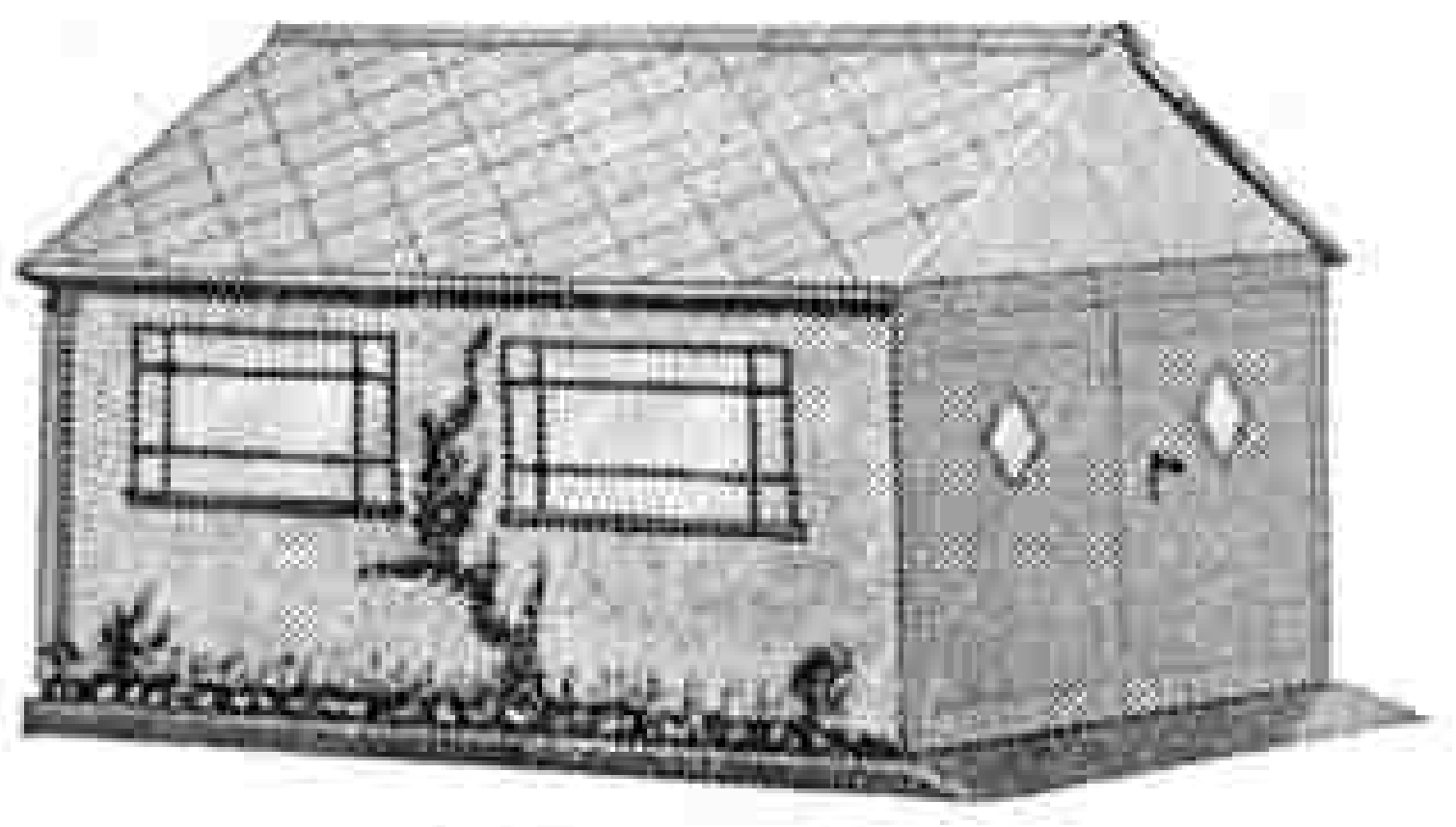
Dinky Toys No. 36g
Fitted with detachable rubber tyres.
Price **11d.** each

DOUBLE DECKER BUS



Dinky Toys No. 29c
Assorted colours. Fitted with detachable rubber tyres.
Price **1/-** each

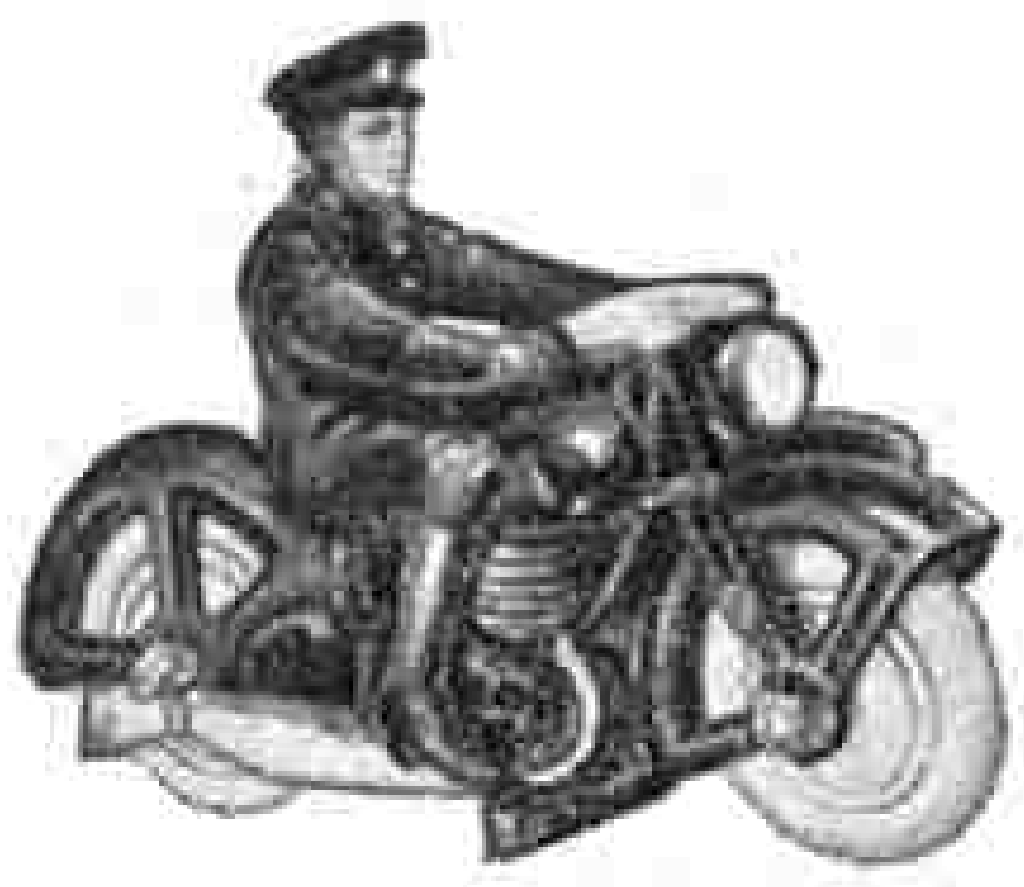
GARAGE



Dinky Toys No. 45
Fitted with opening double doors. Will accommodate any two Dinky Toys Motor Cars.
Price **1/3** each

POLICE MOTOR CYCLIST

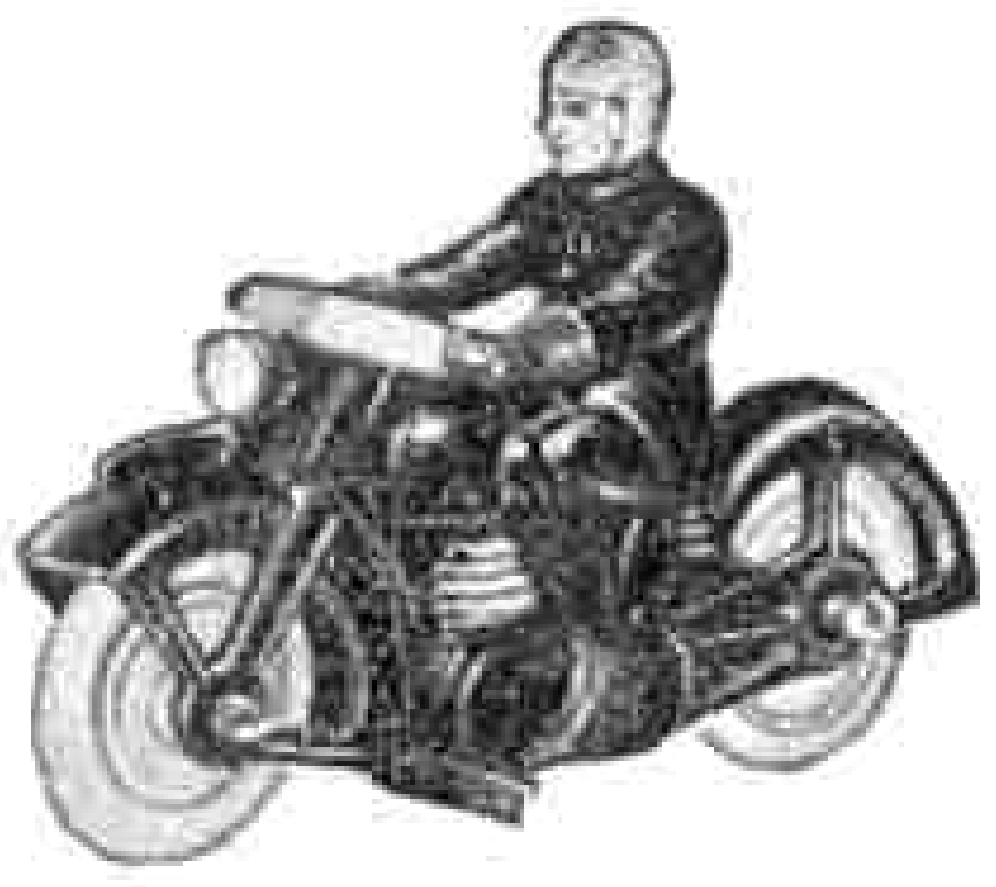
Dinky Toys No. 37b



Price **6d.** each

CIVILIAN MOTOR CYCLIST

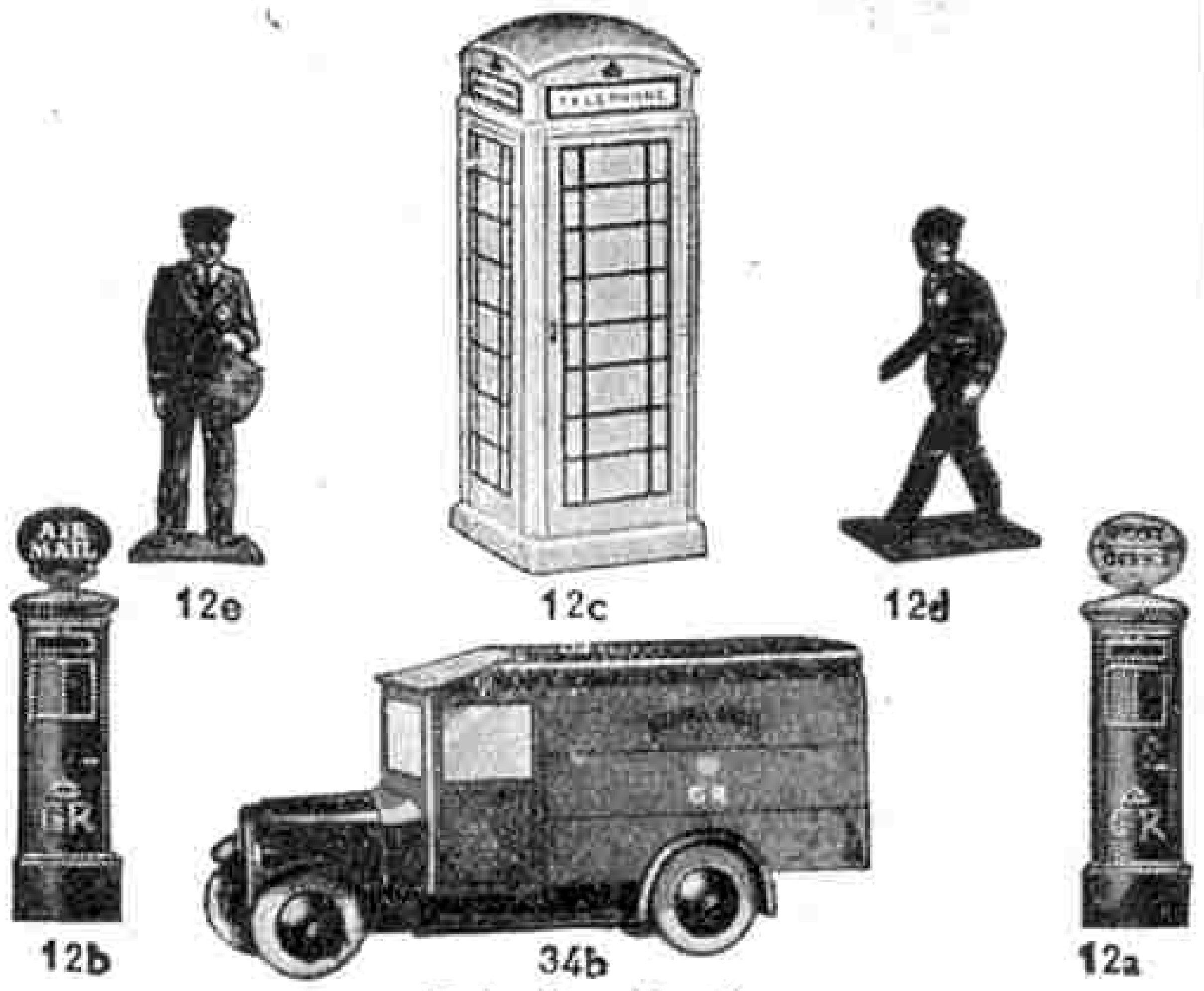
Dinky Toys No. 37a



Assorted colours. Price **6d.** each

Royal Corps of Signals Despatch Rider. Dinky Toys No. 37c
Similar to Dinky Toys No. 37b. Finished in correct colours. Rubber tyres. Price **6d.** each

POSTAL SET

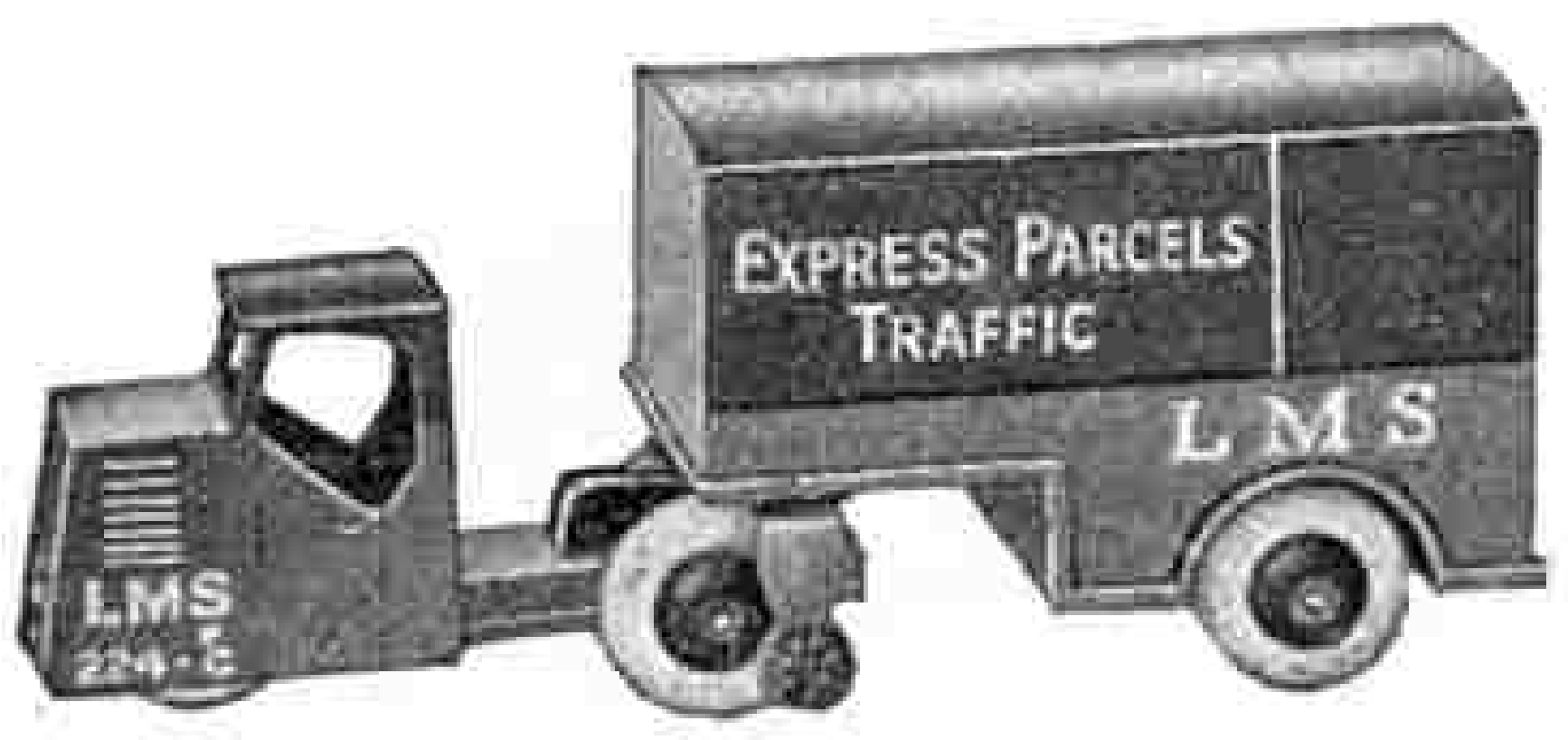


Dinky Toys No. 12

No. 12a Pillar Box, G.P.O.	each **3d.**
No. 12b " " Air Mail	" **3d.**
No. 12c Telephone Call Box	" **4d.**
No. 12d Telegraph Messenger	" **3d.**
No. 12e Postman	" **3d.**
No. 34b Royal Mail Van	" **10d.**

Price of complete set **2/3**

RAILWAY MECHANICAL HORSE AND TRAILER VAN

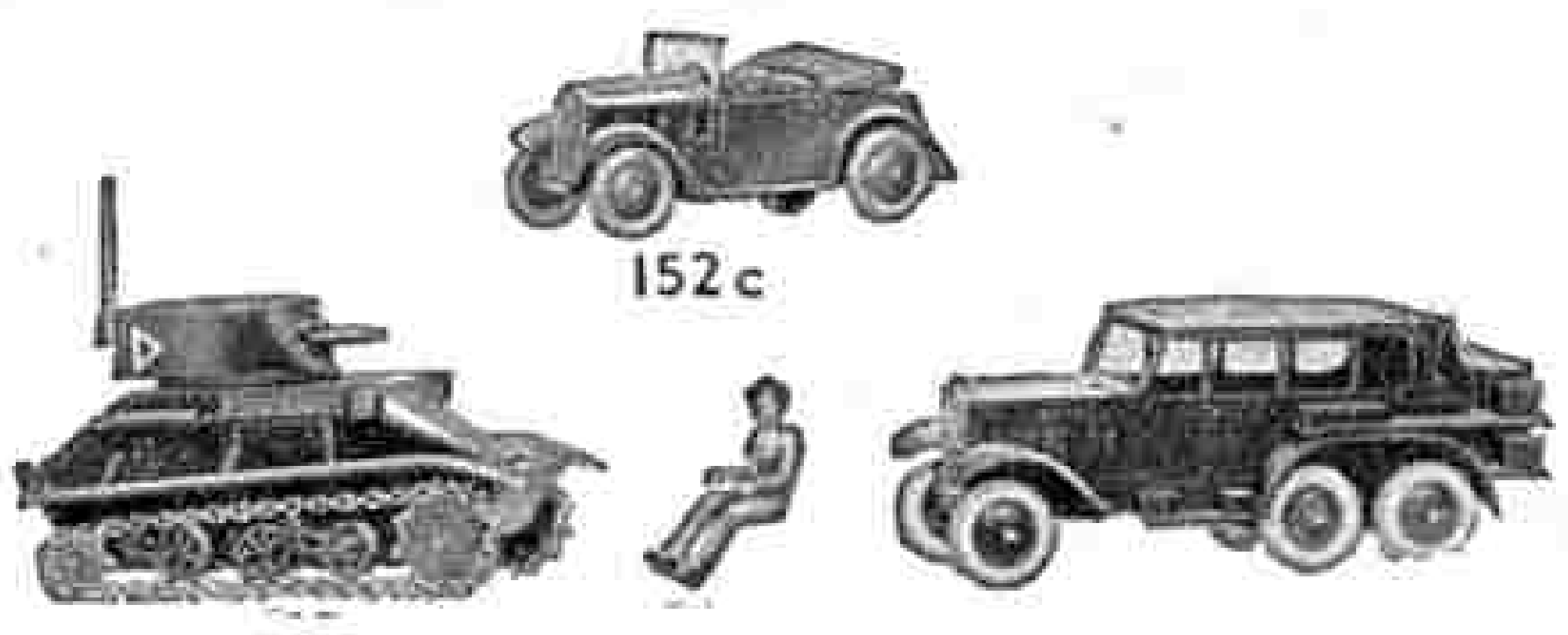


Dinky Toys No. 33R
Fitted with detachable rubber tyres.

No. 33Ra Railway Mechanical Horse	each **8d.**
No. 33Rd Trailer Van	" **10d.**

Price, complete, L.M.S.R., L.N.E.R., G.W.R. or S.R. ... **1/6**

ROYAL TANK CORPS LIGHT TANK SET

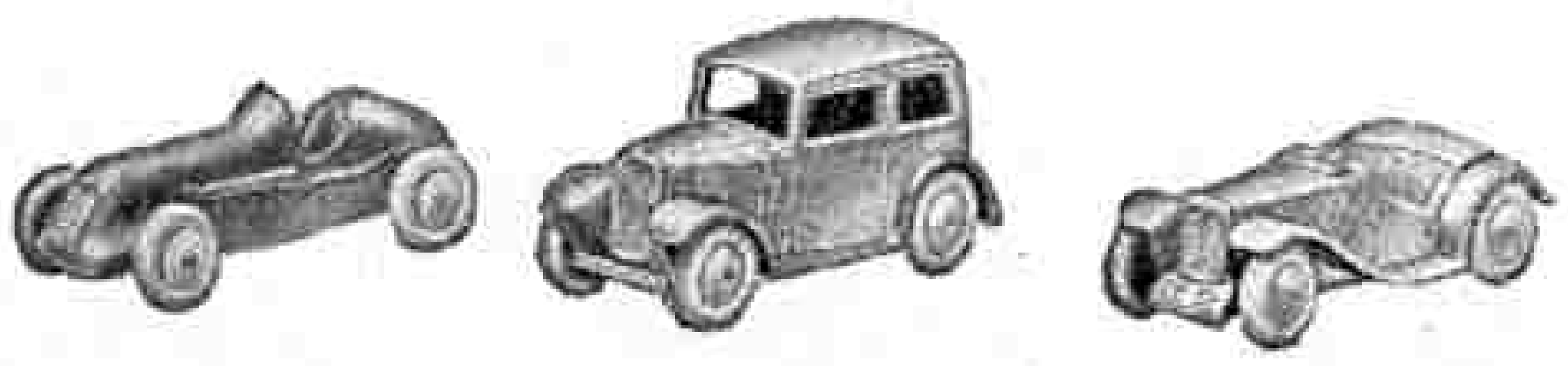


Dinky Toys No. 152

No. 152a Light Tank (4½ tons, 25 h.p.)	each **1/2**
No. 152b Reconnaissance Car ...	" **1/-**
No. 152c Austin Seven Car ...	" **4d.**
No. 150d Driver	" **3d.**

Price of complete set **2/9**

SMALL CARS



Dinky Toys No. 35 Fitted with rubber tyres

No. 35a Saloon Car	each **3d.**
No. 35b Racer	each **3d.**
No. 35c "M.G." Sports Car	" **3d.**

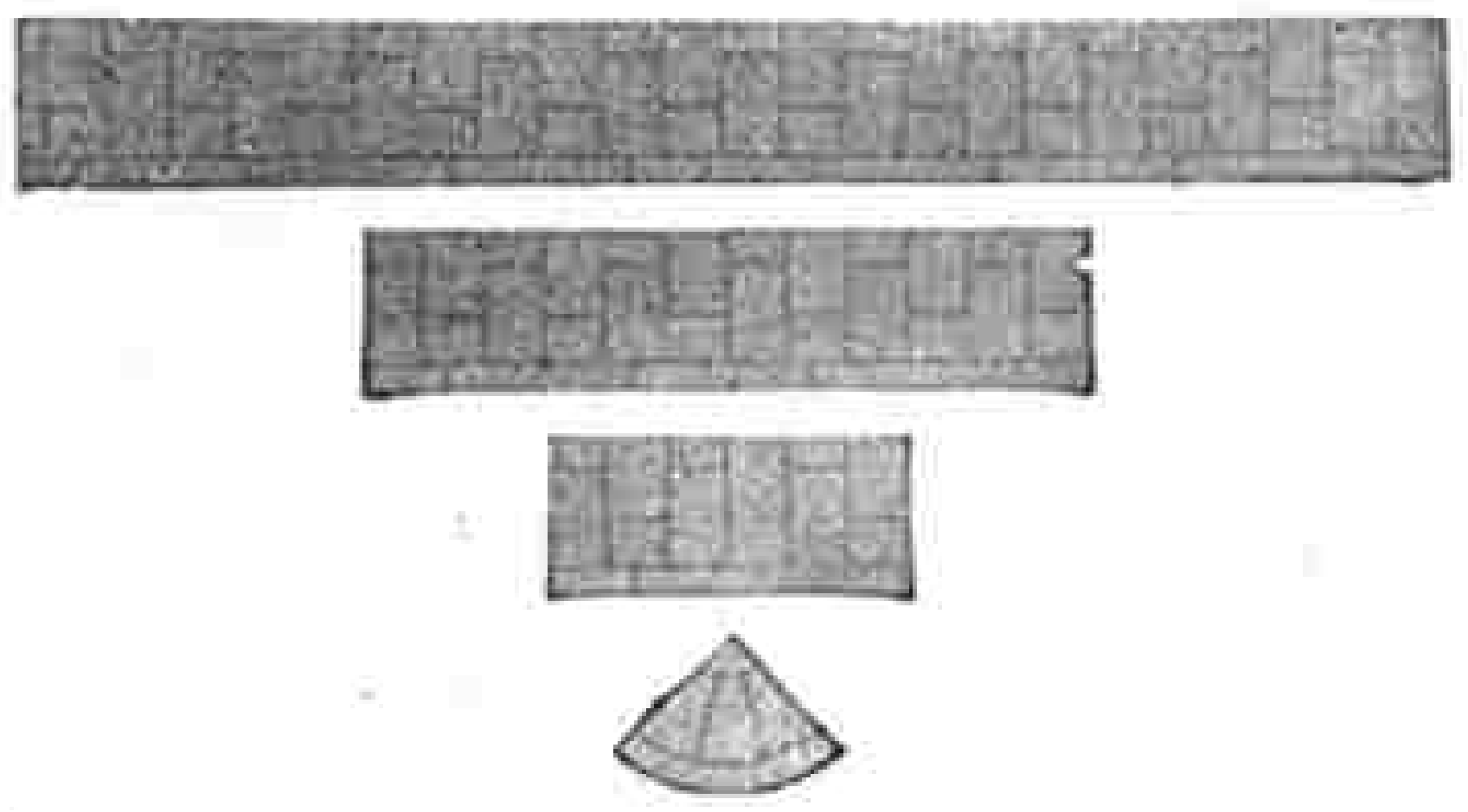
Price of complete set **9d.**

AUSTIN SEVEN CAR

Dinky Toys No. 35d

This model is the same as No. 152c, illustrated above, except that it is finished in a range of different colours. Price **4d.** each.

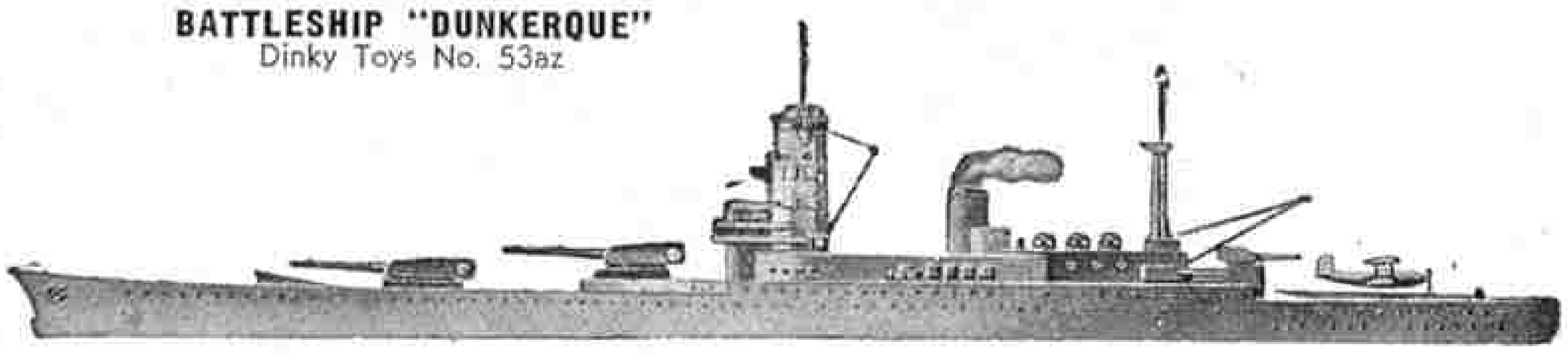
PAVEMENT SET



Dinky Toys No. 46
The contents of this set are four 3 in., six 6 in. and four 12 in. strips of pavement and four quarter discs for corners. Price of complete set **6d.**

BATTLESHIP "DUNKERQUE"

Dinky Toys No. 53az



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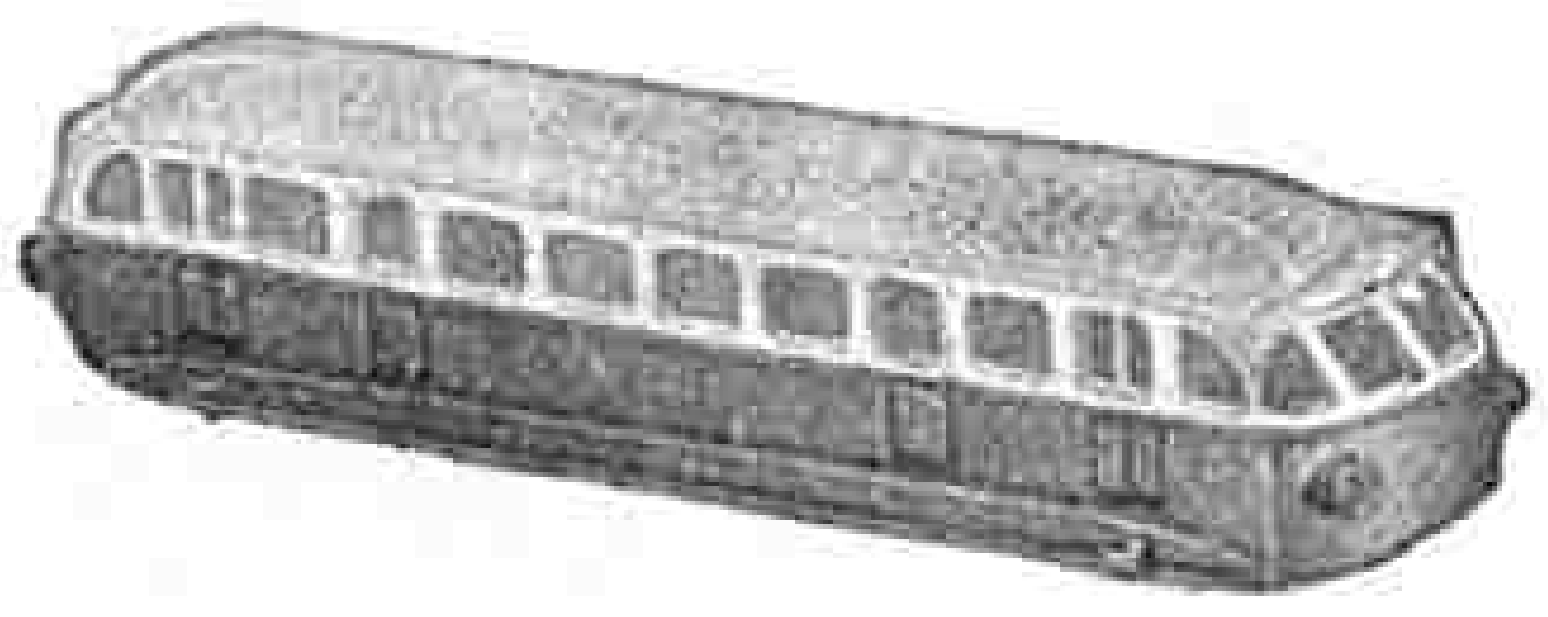
DIESEL RAIL CAR



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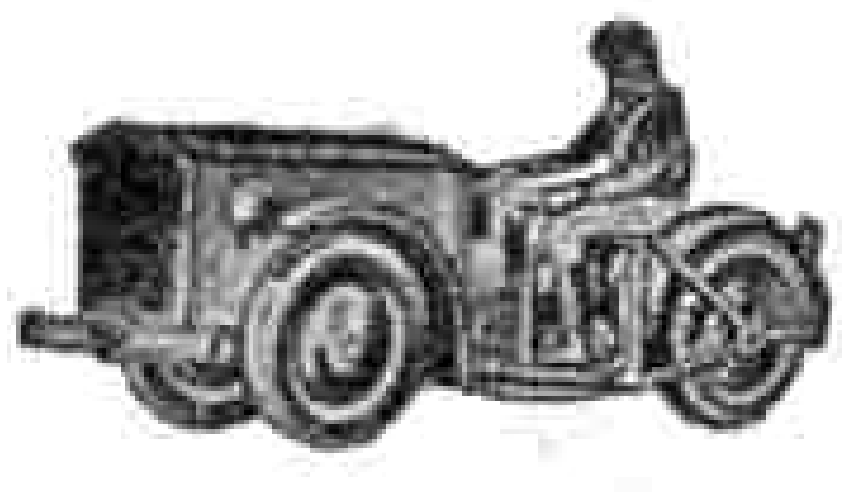

Dinky Toys No. 14z
Fitted with opening lid.
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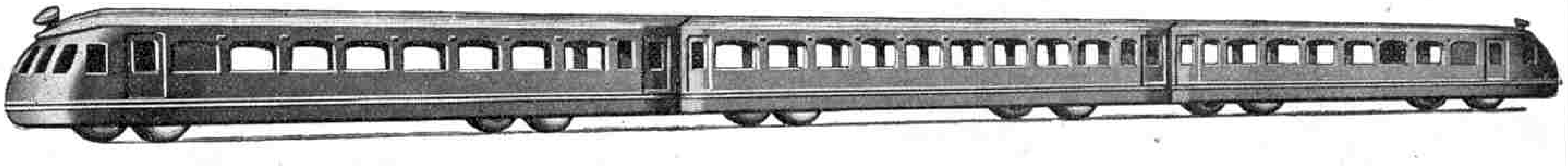

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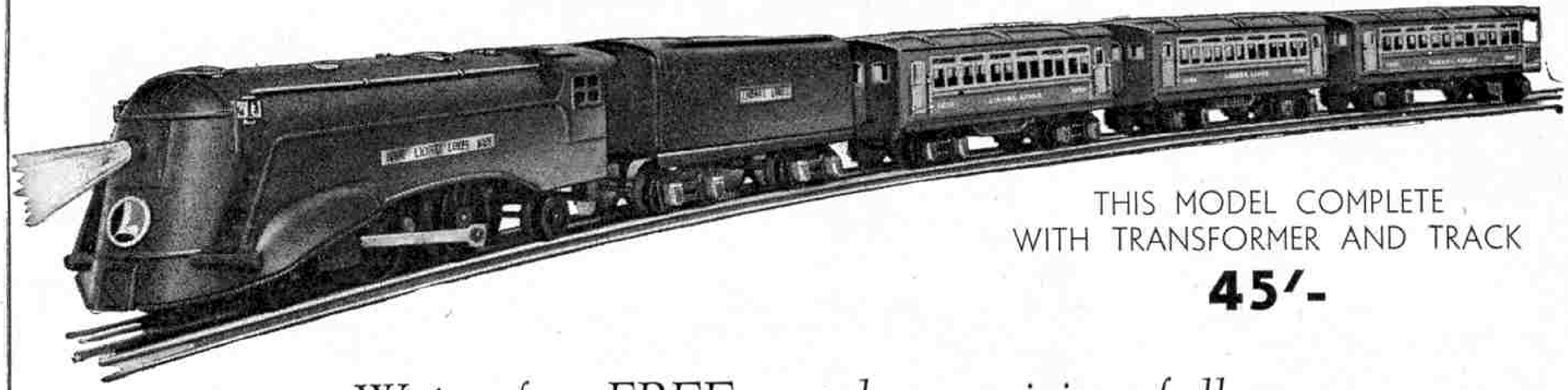

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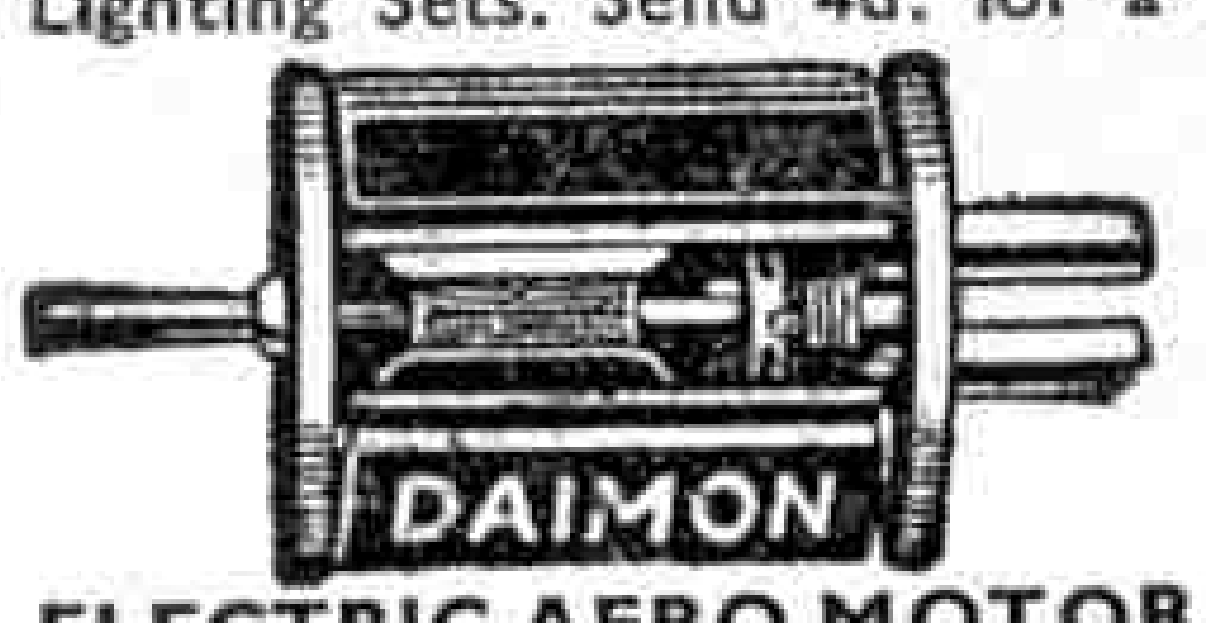

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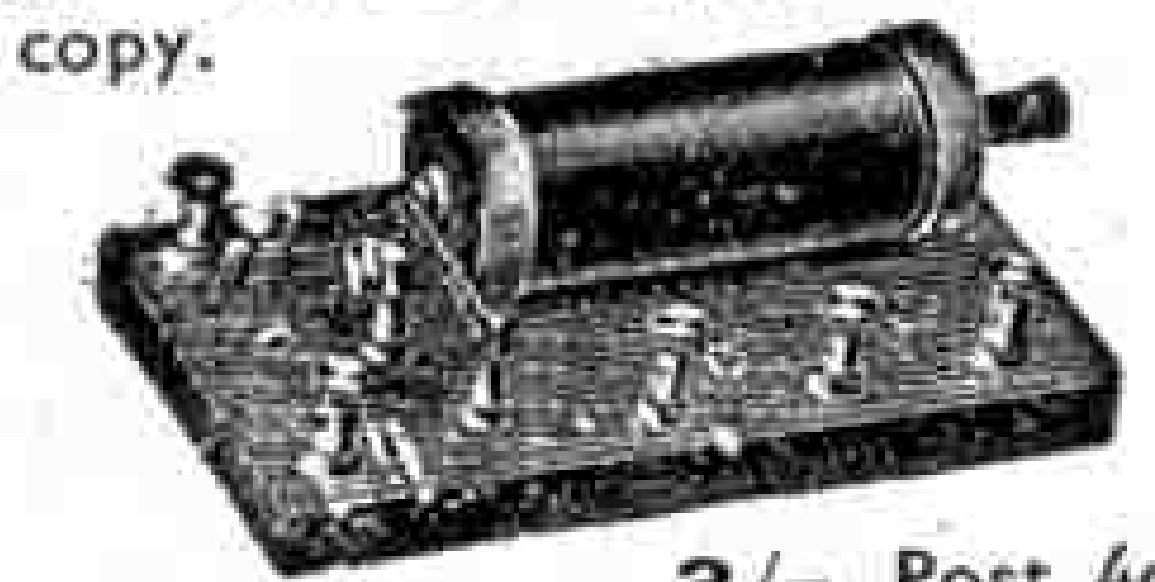

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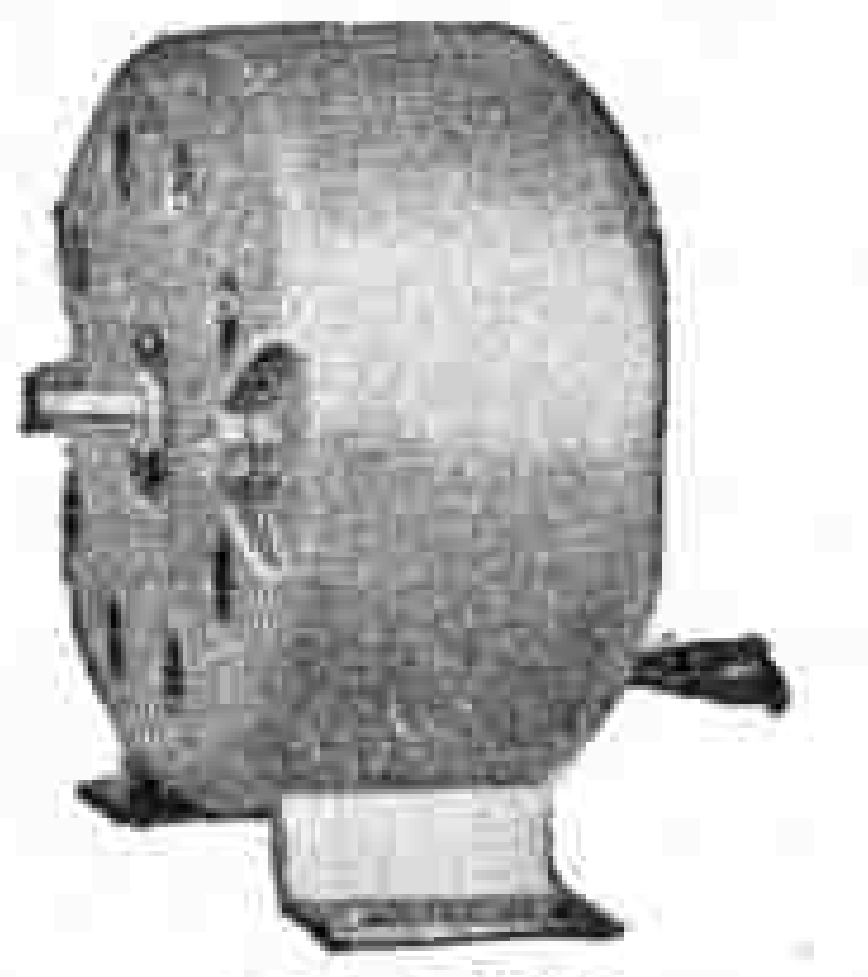

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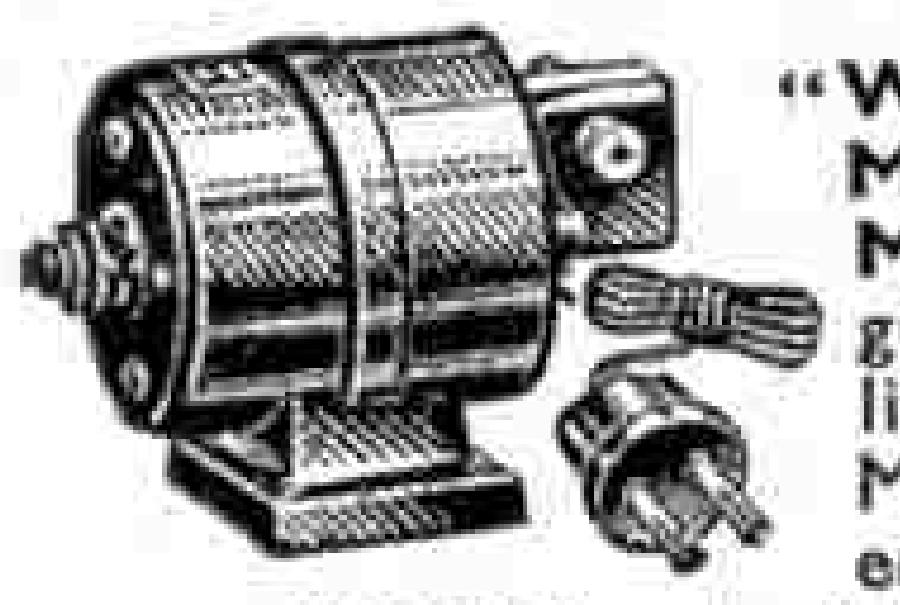

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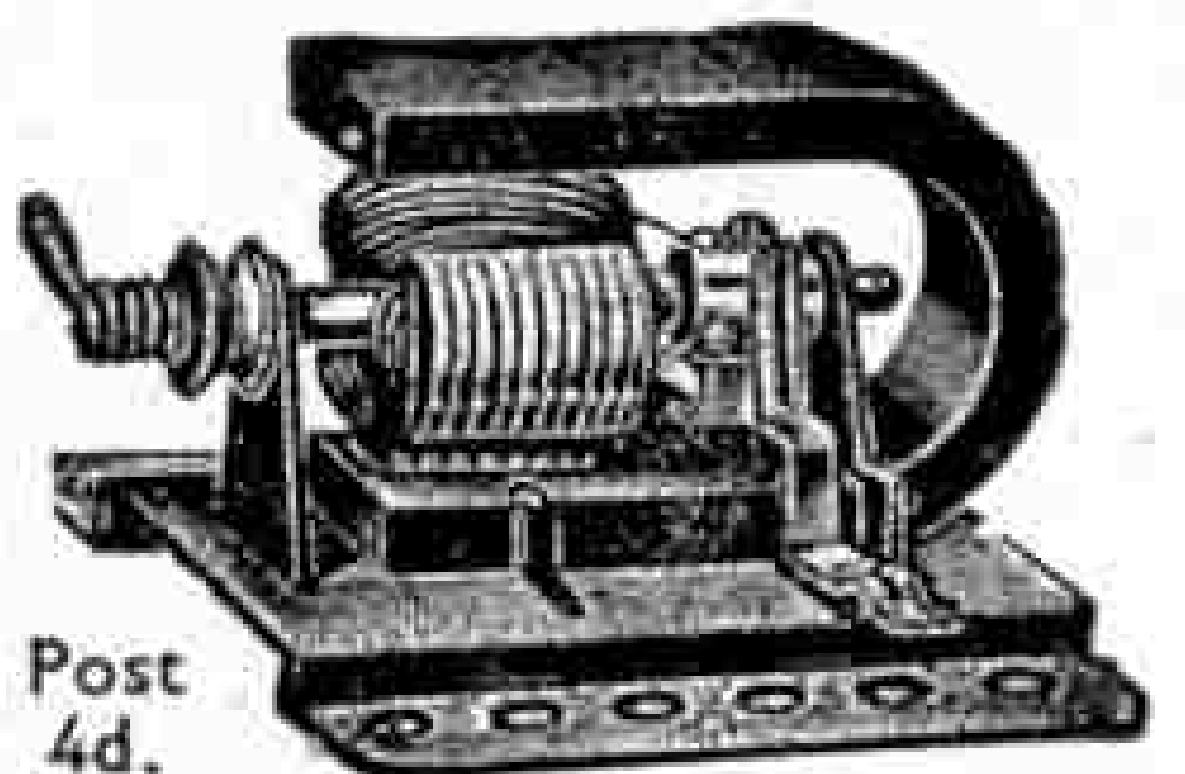

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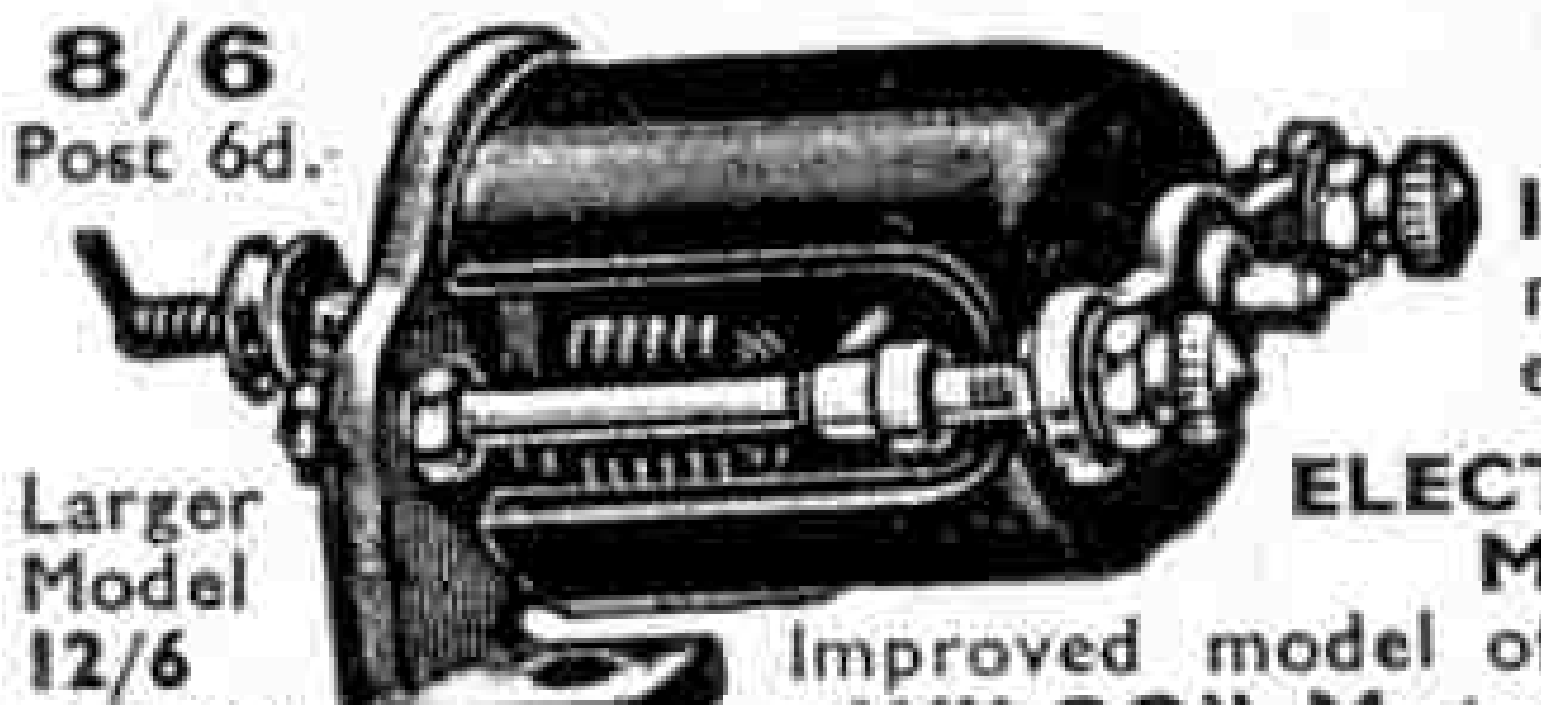

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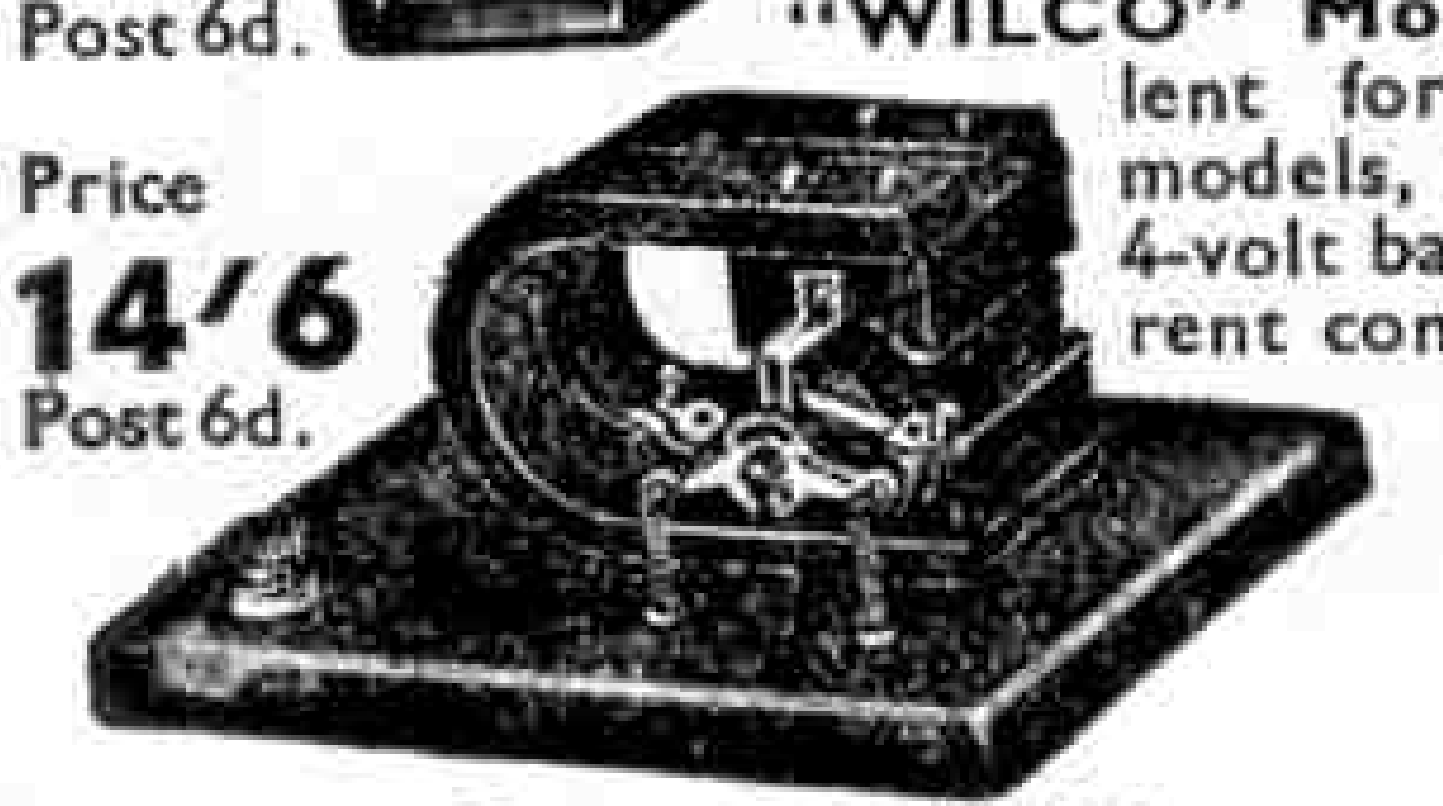

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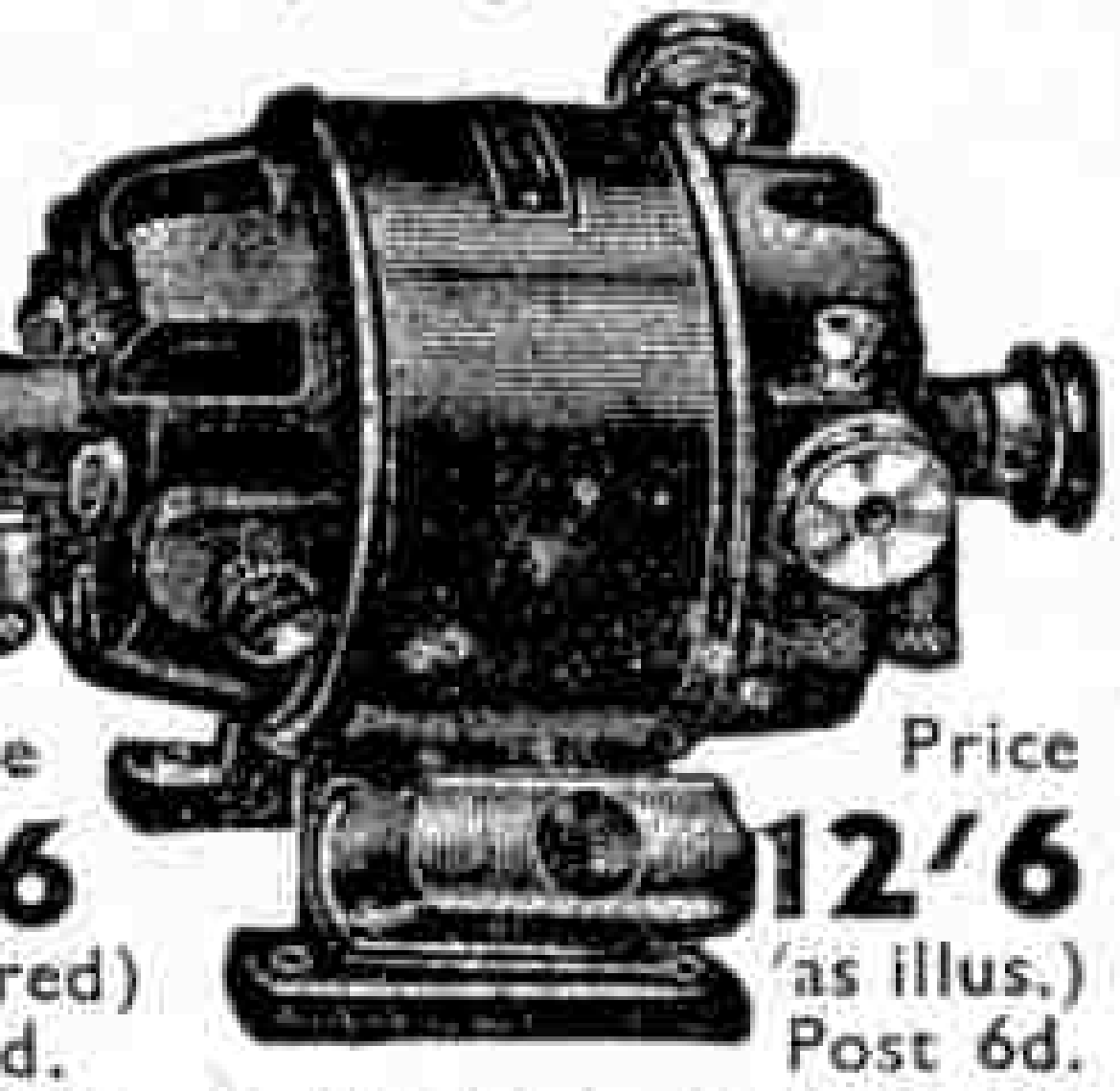

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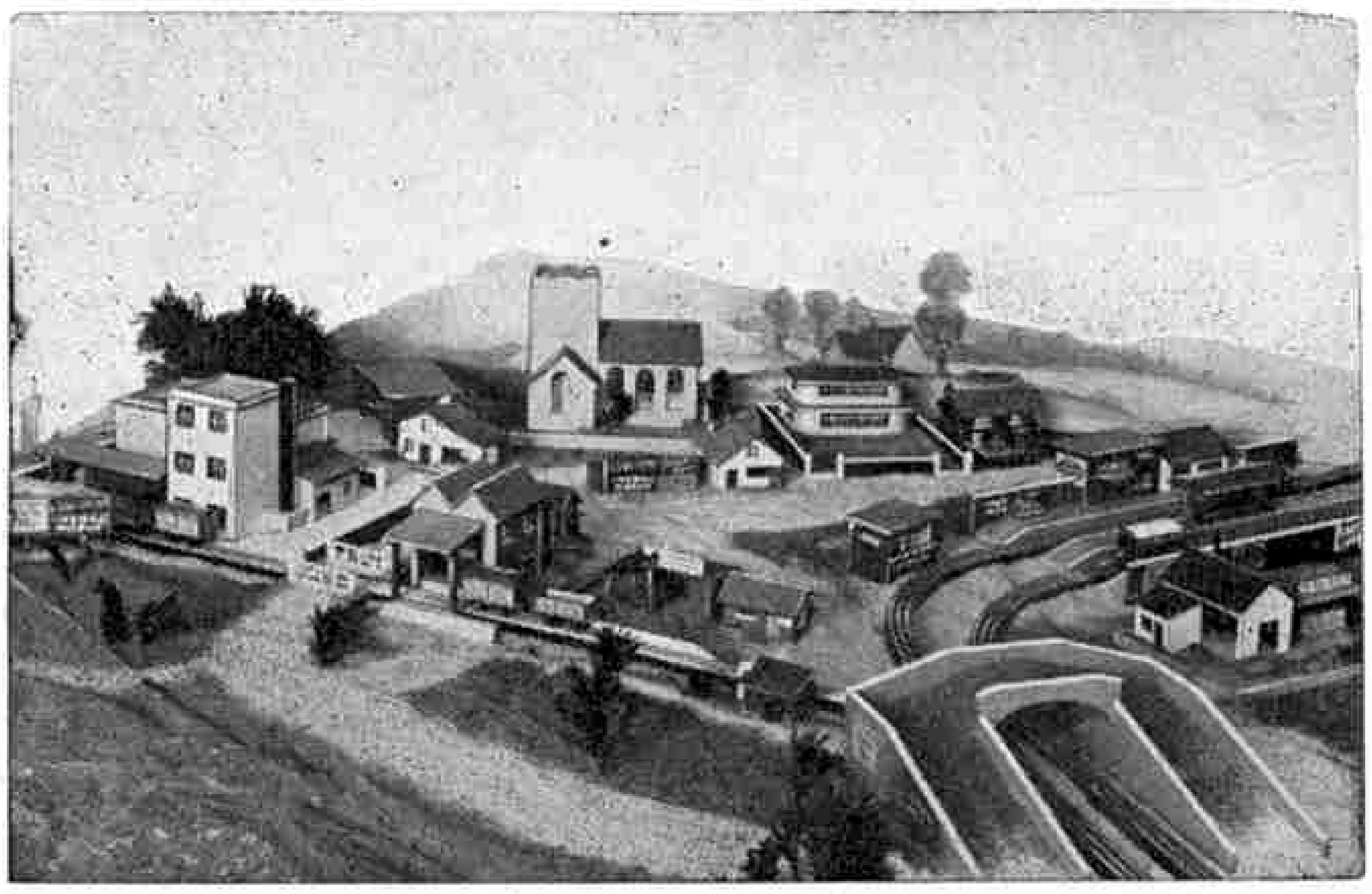

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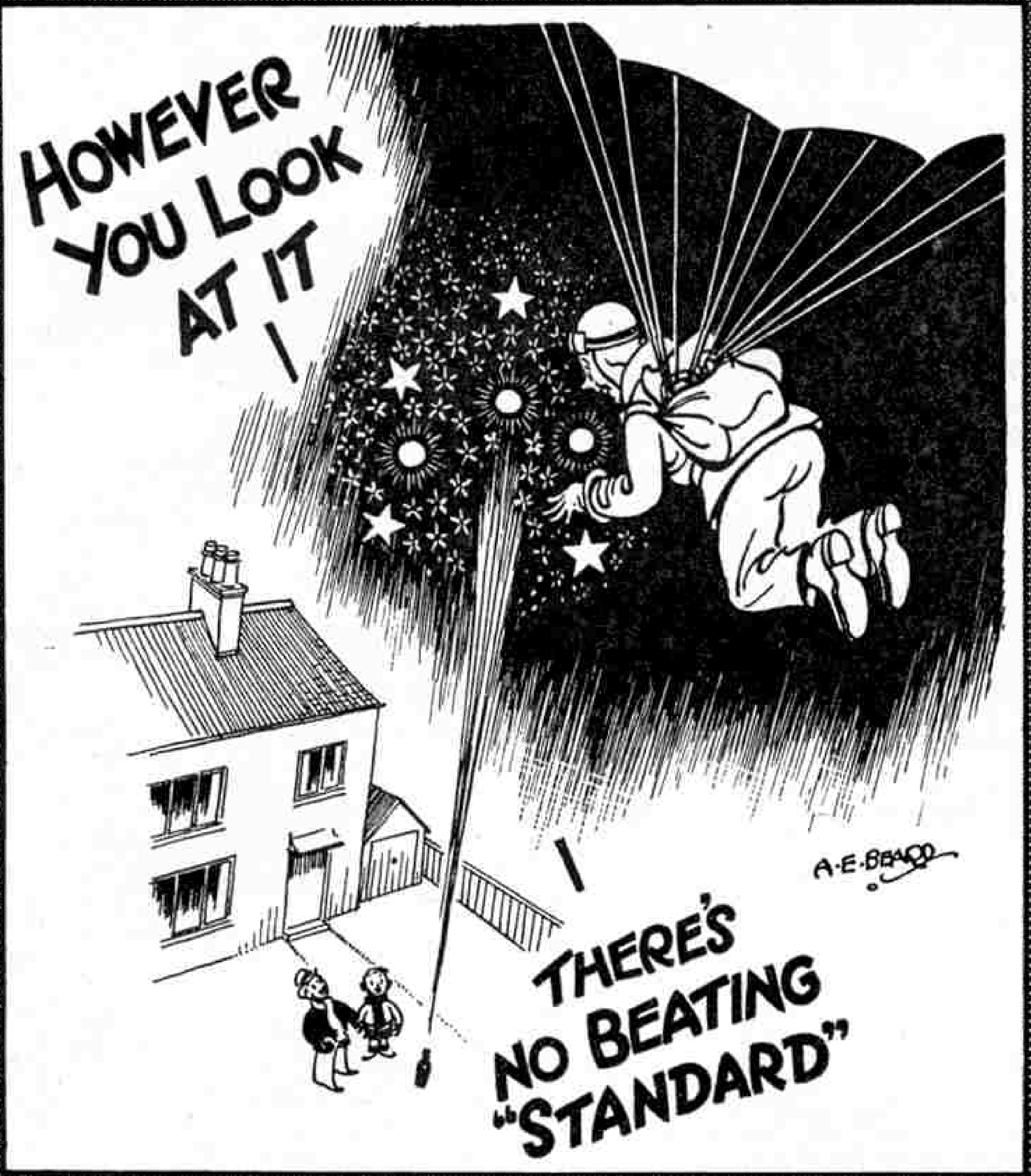

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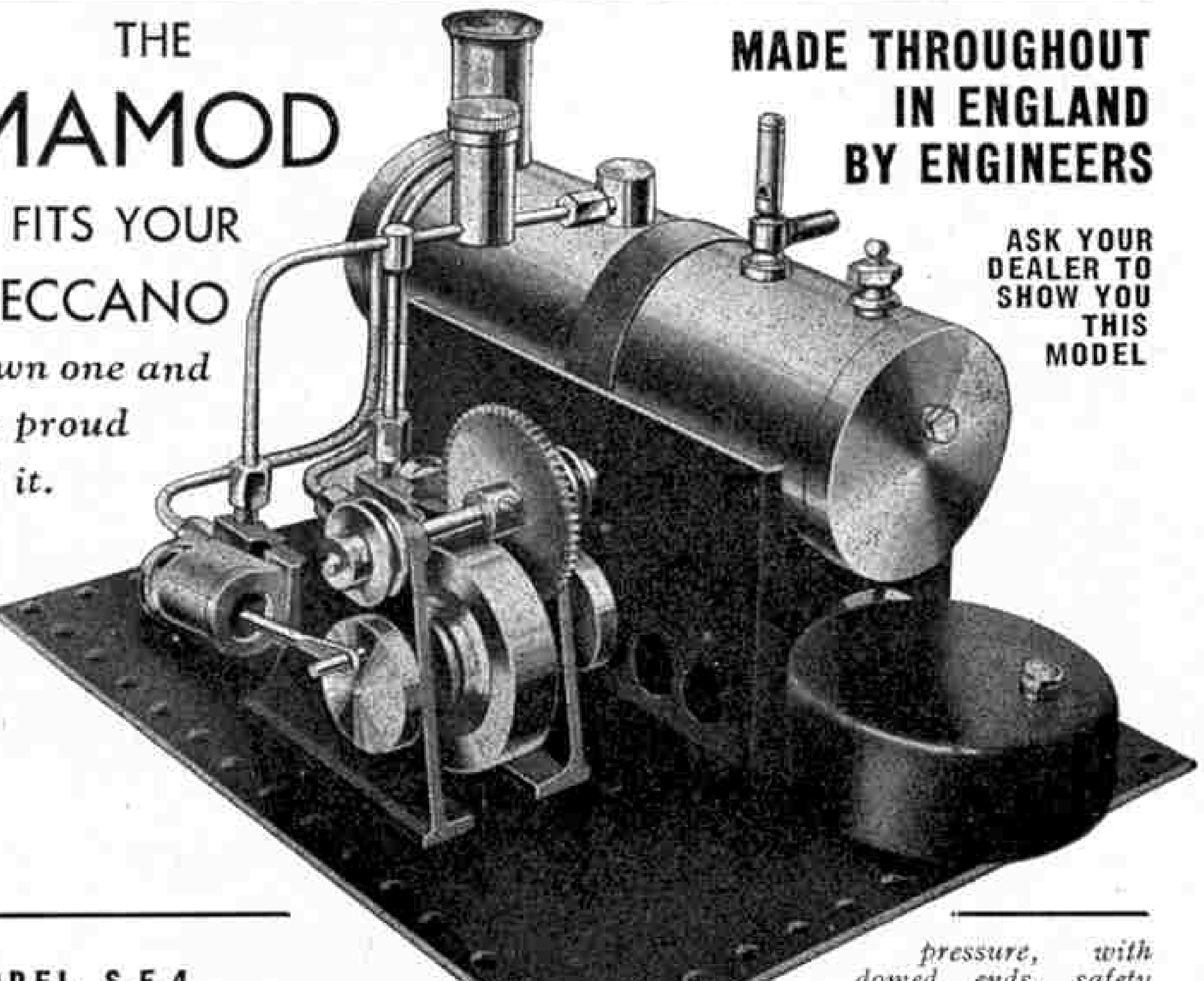

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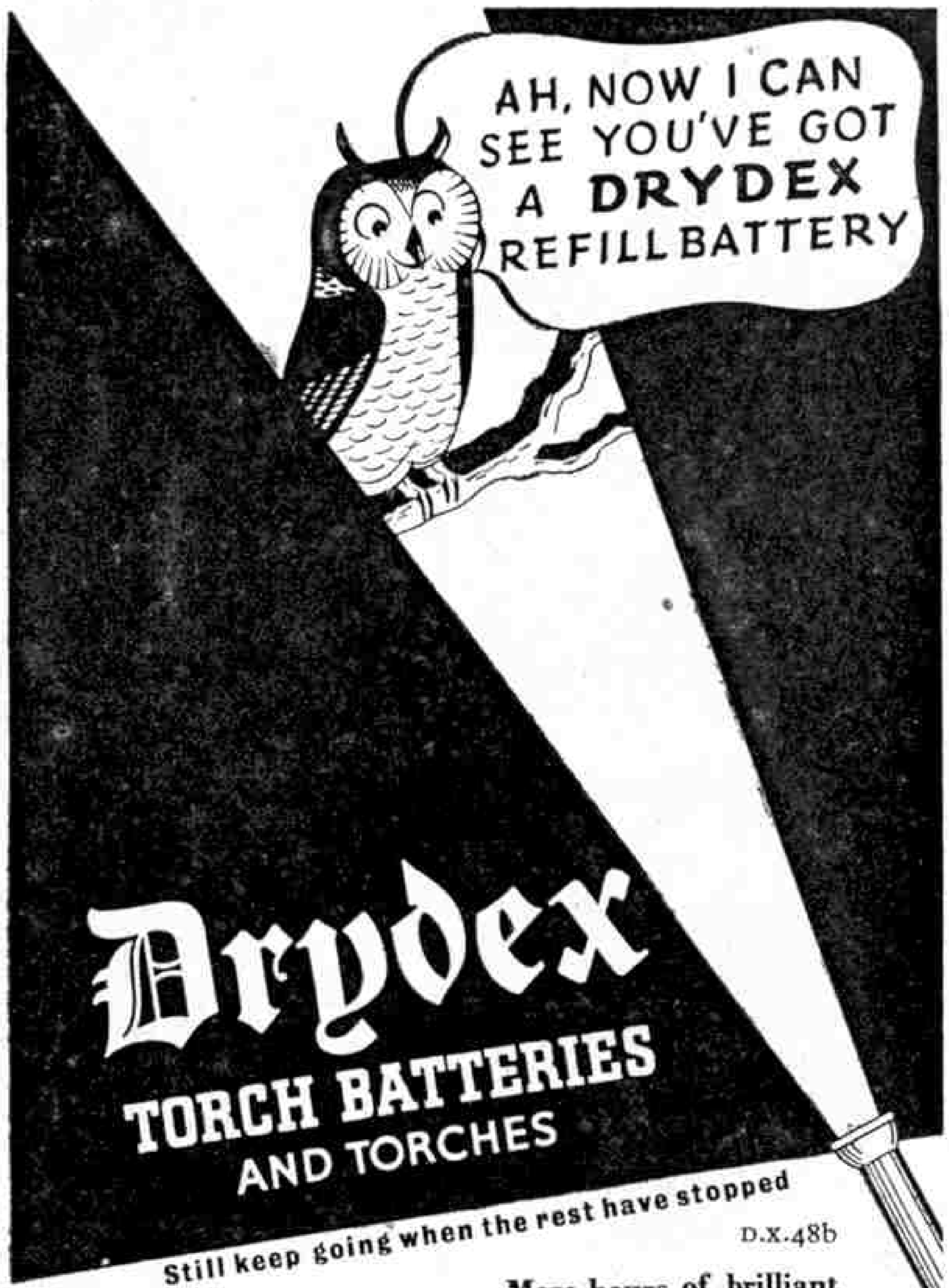
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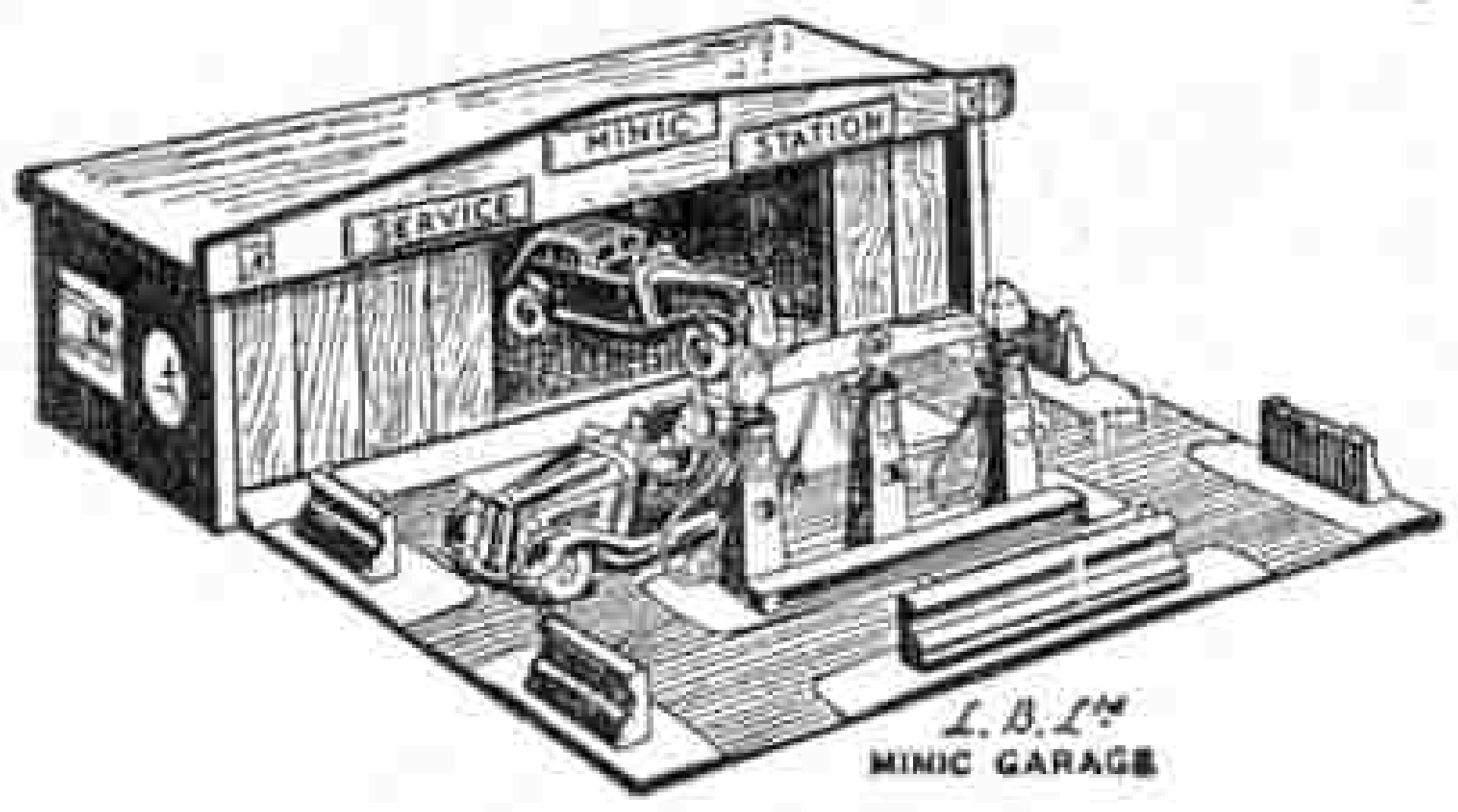
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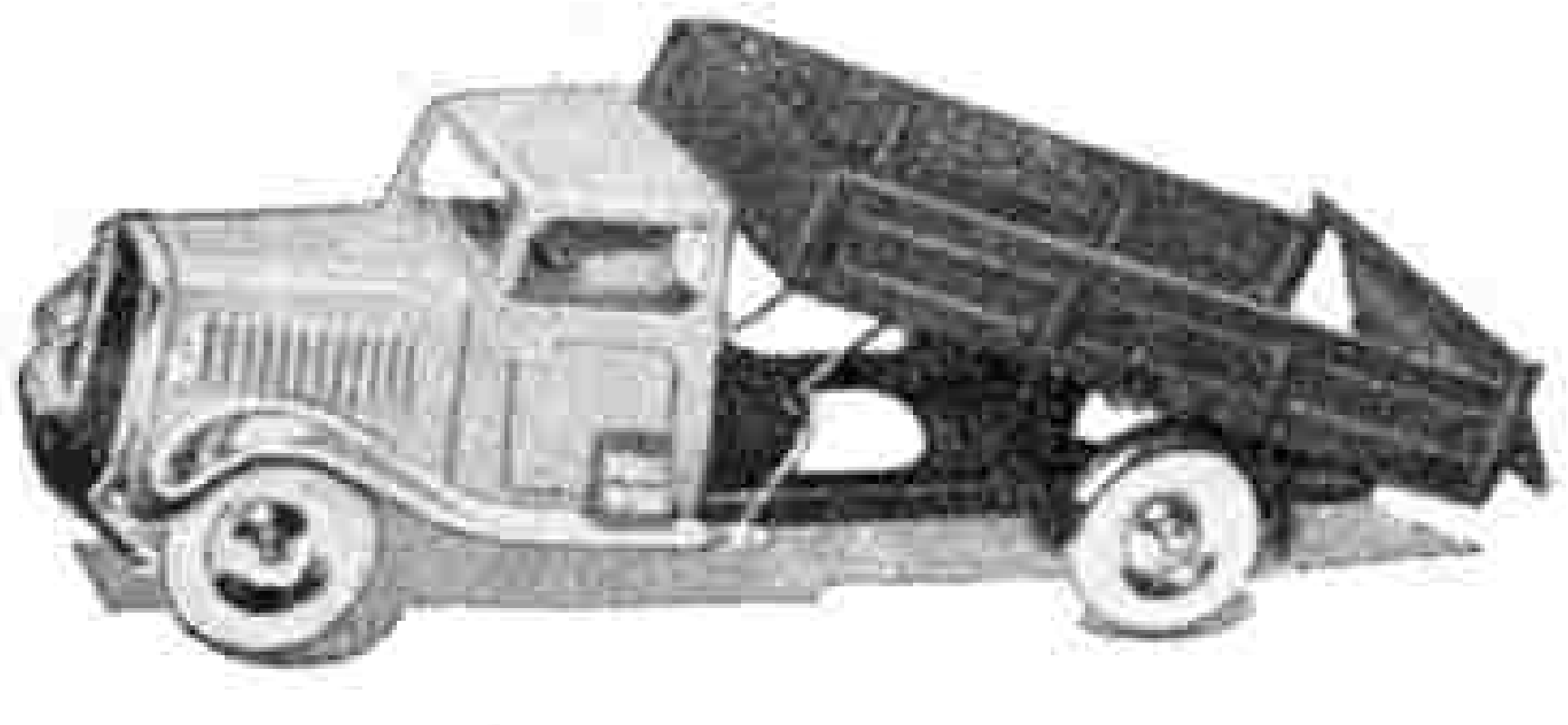

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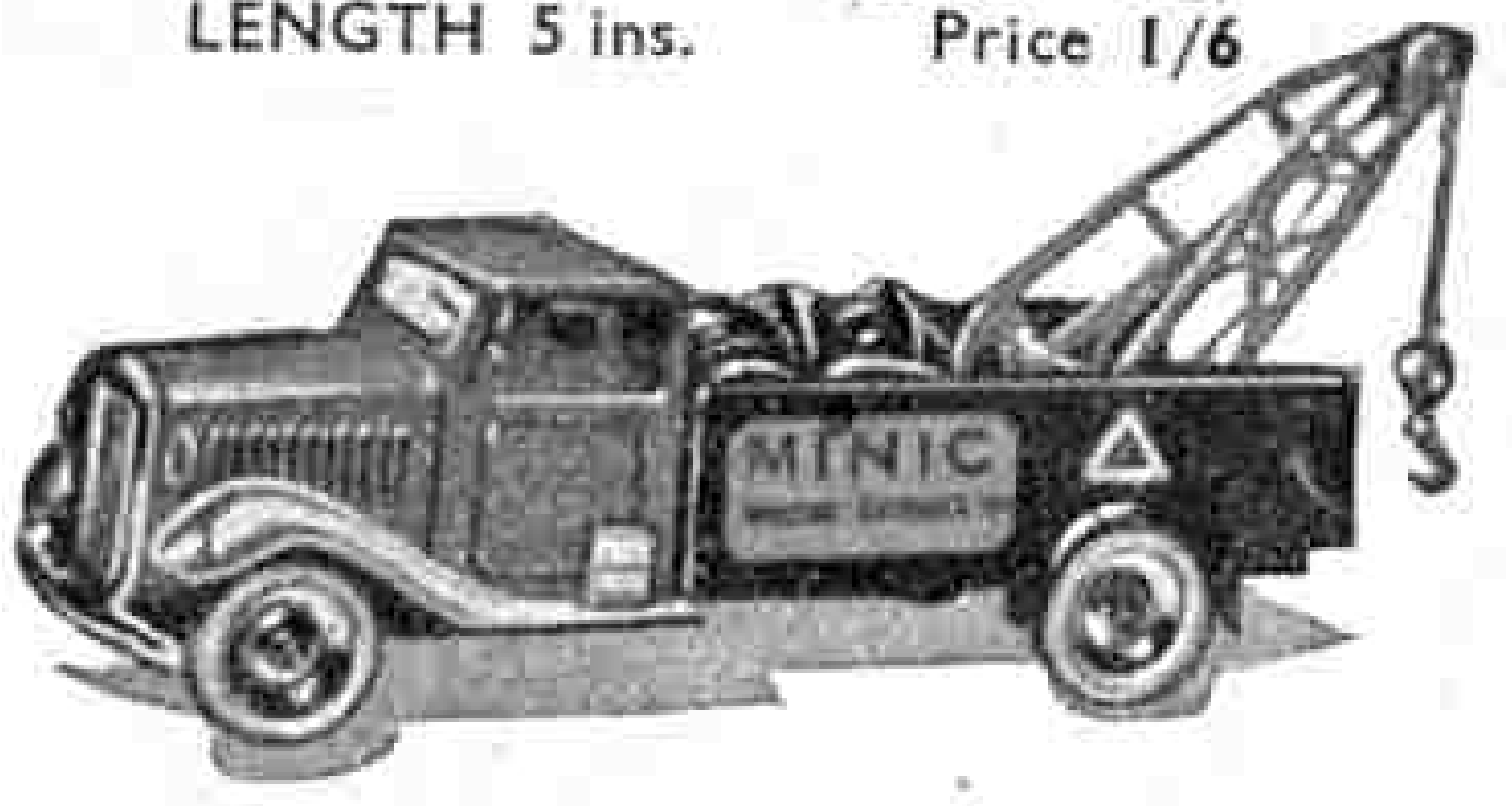

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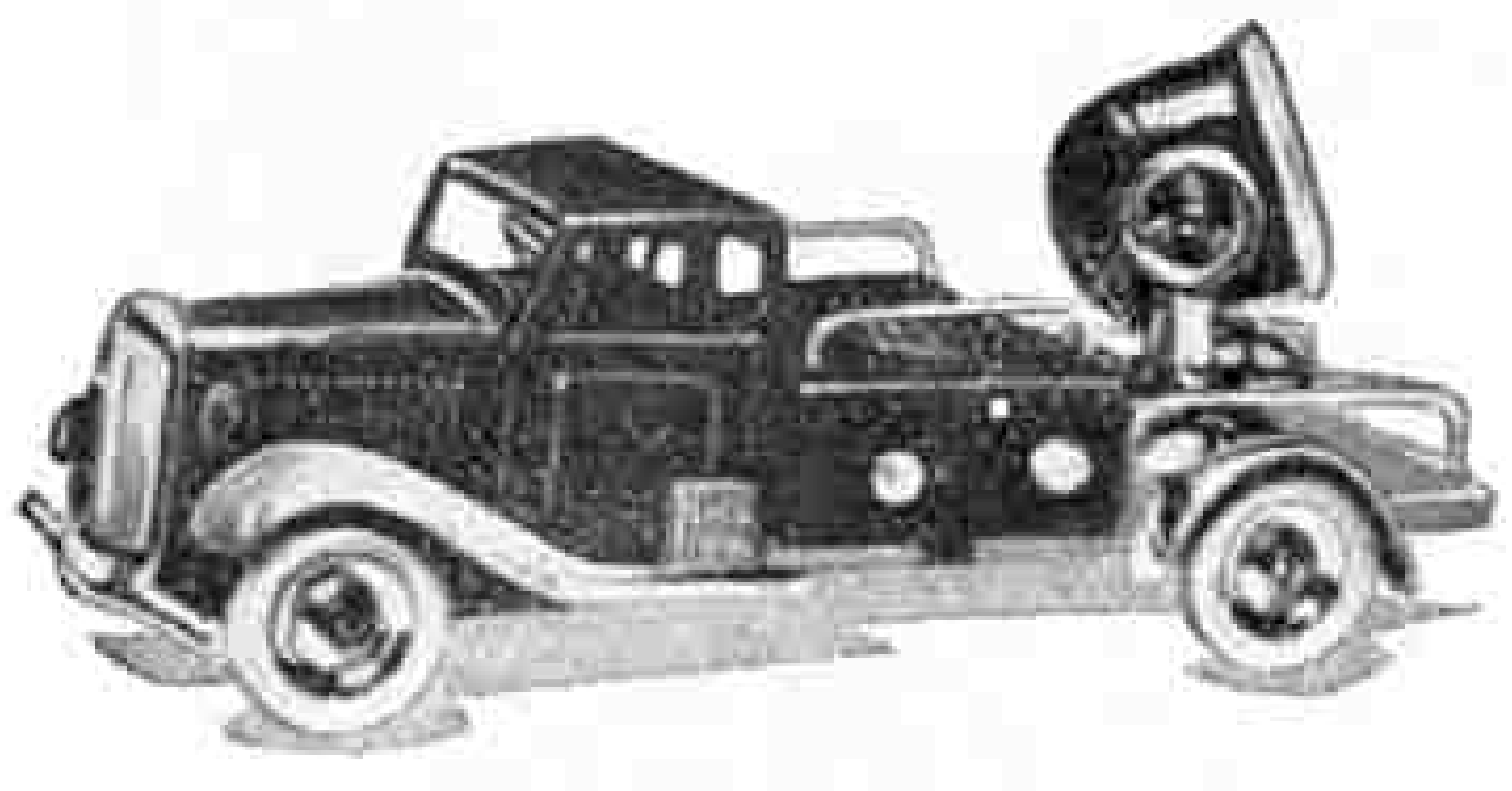

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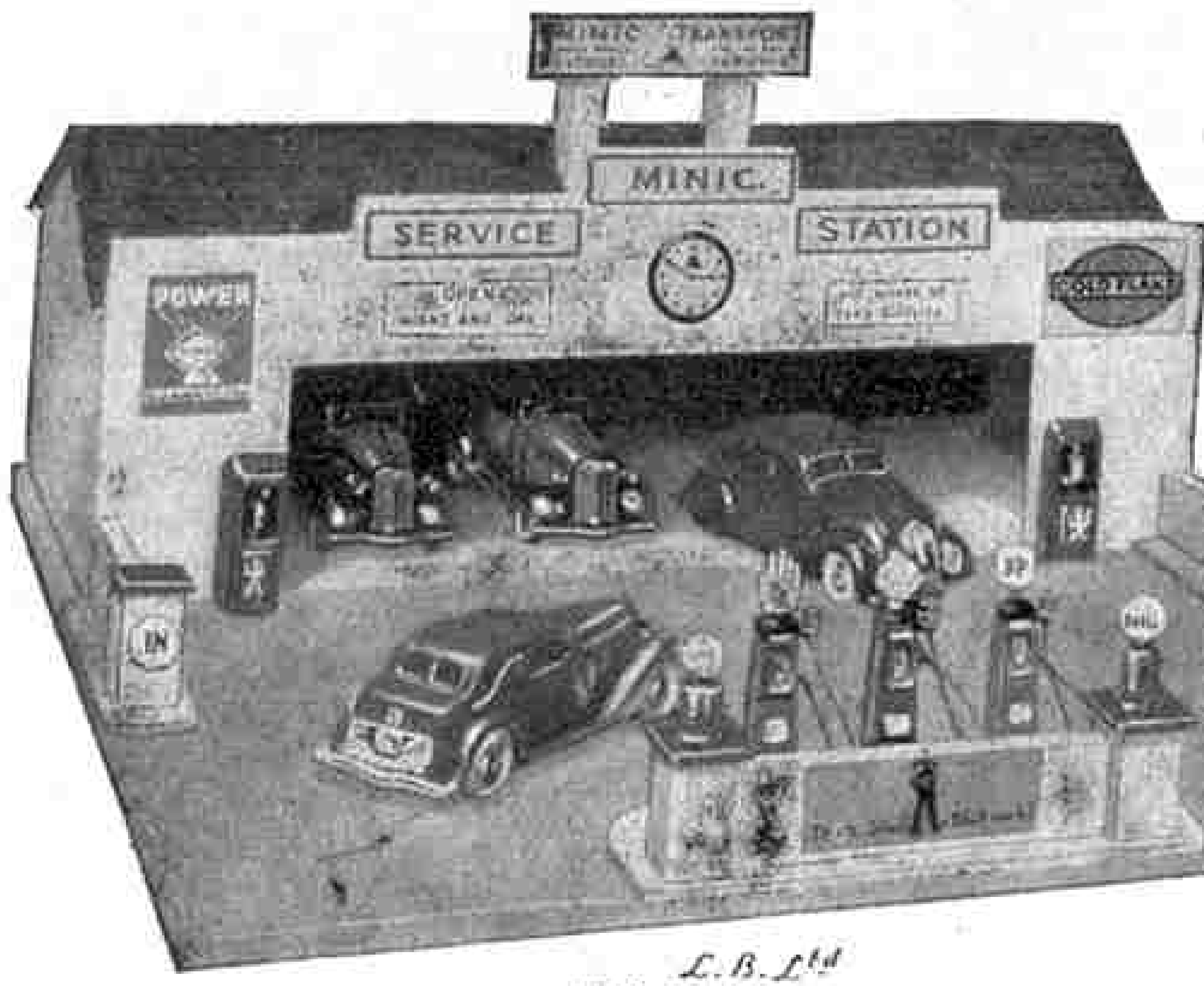
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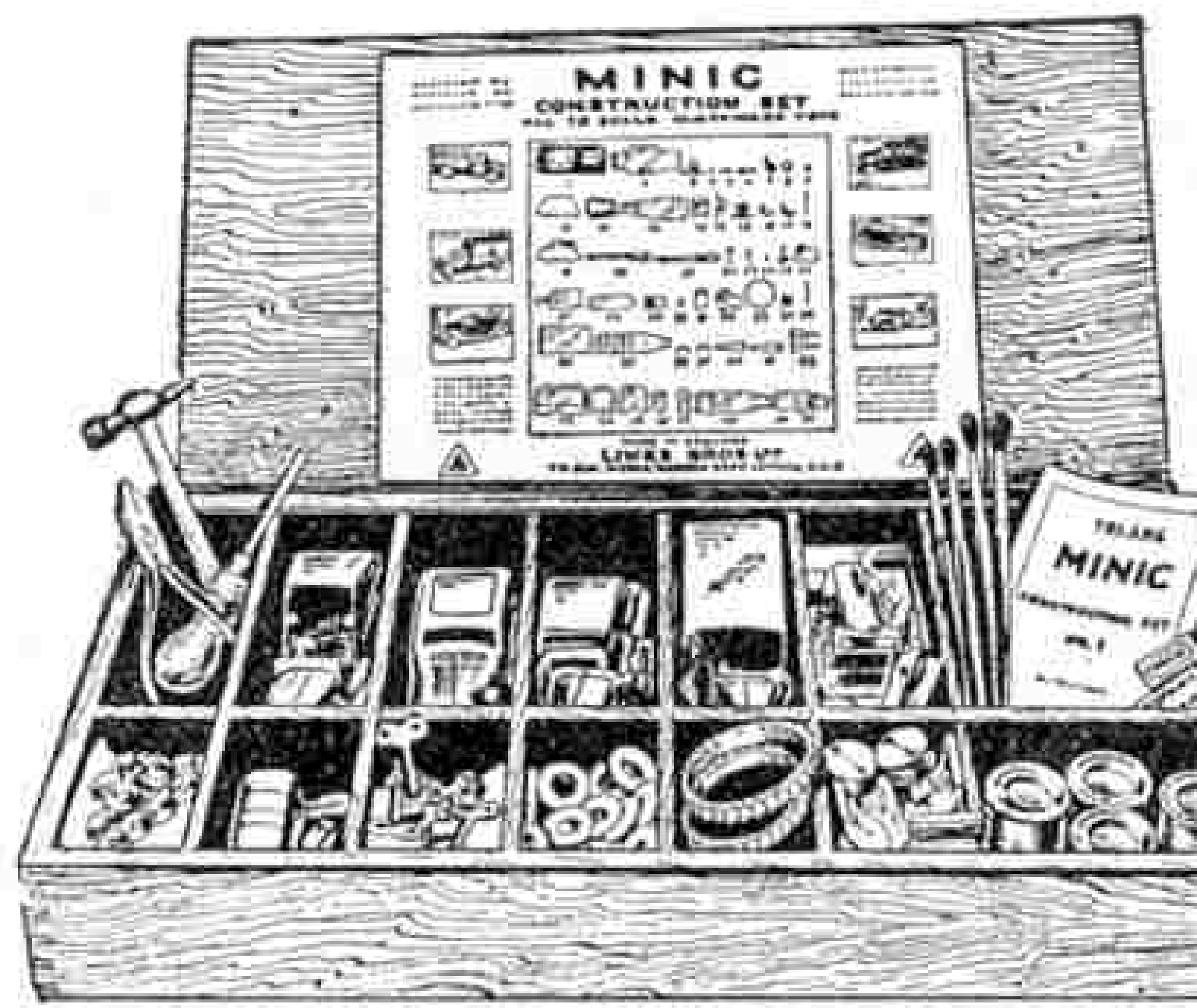
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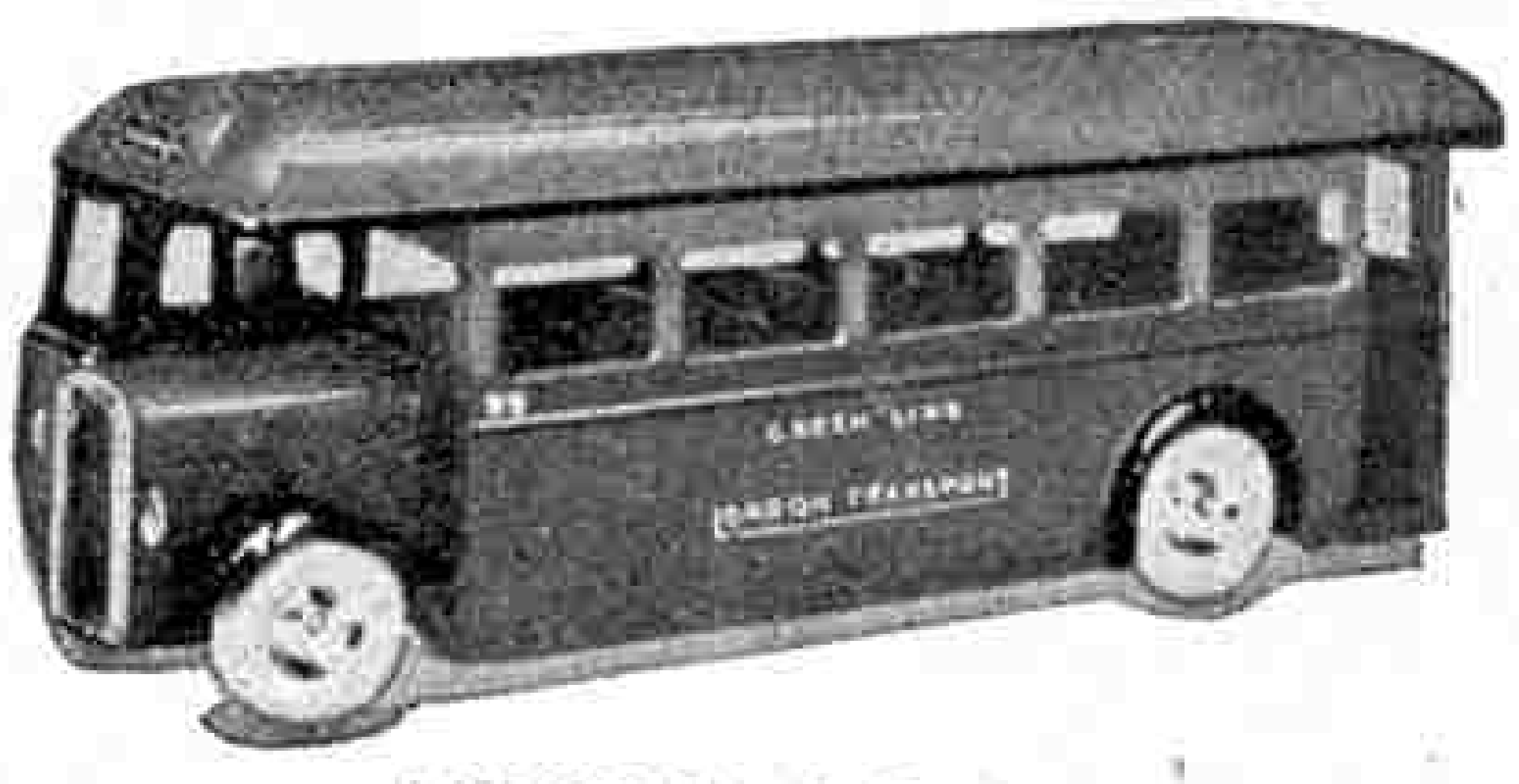
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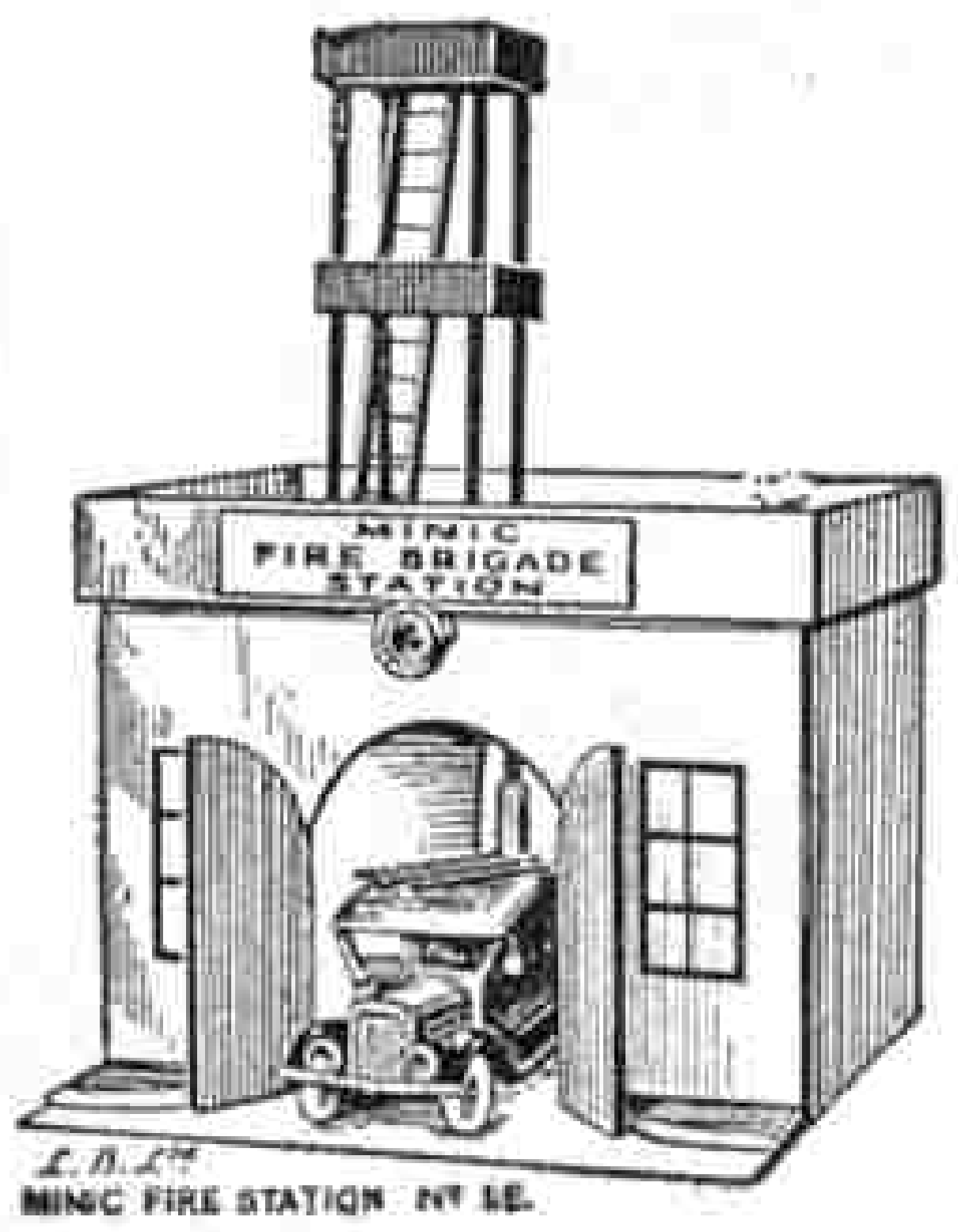
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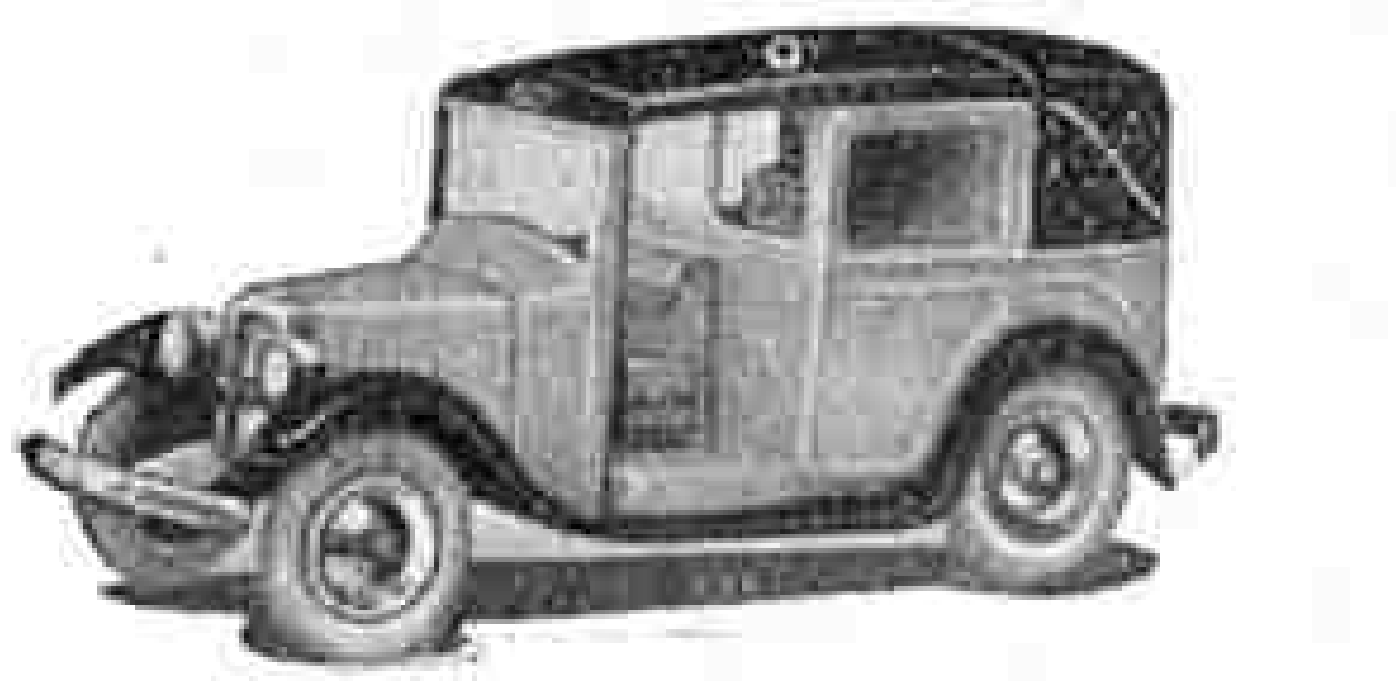

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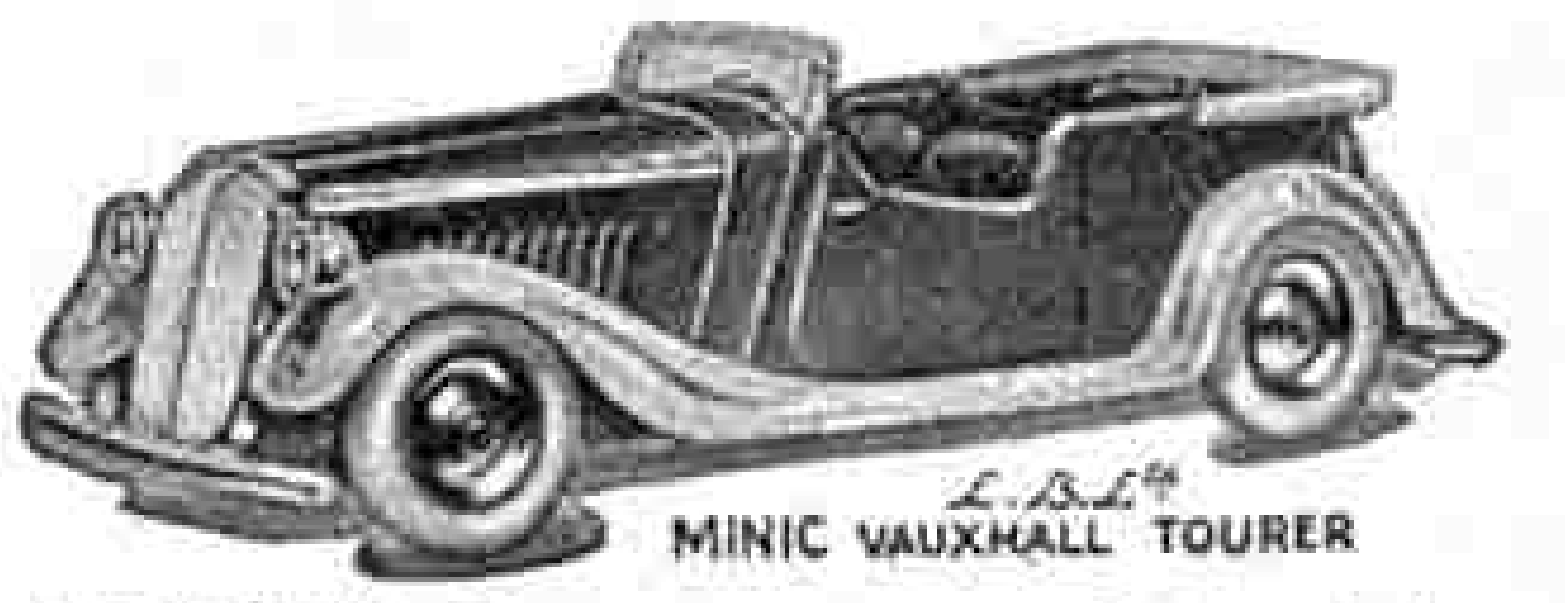
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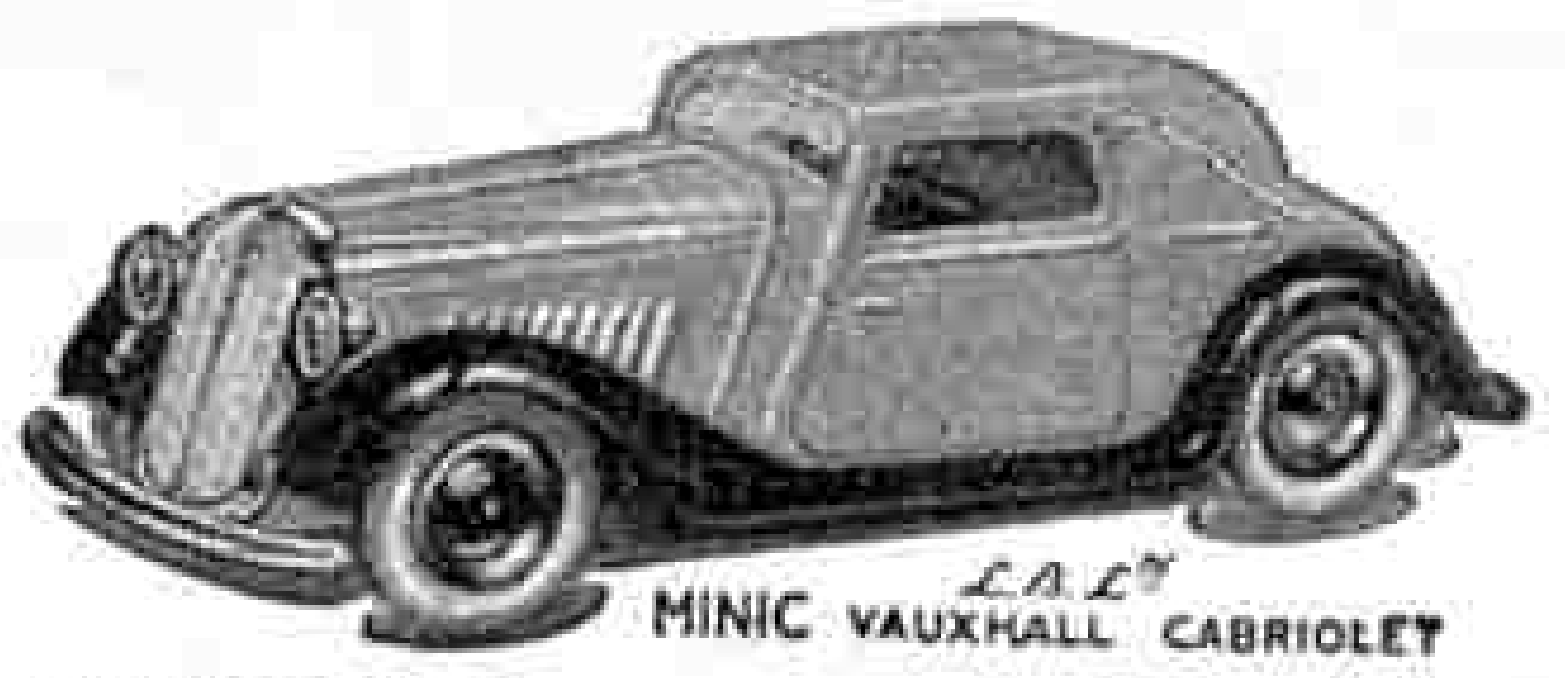
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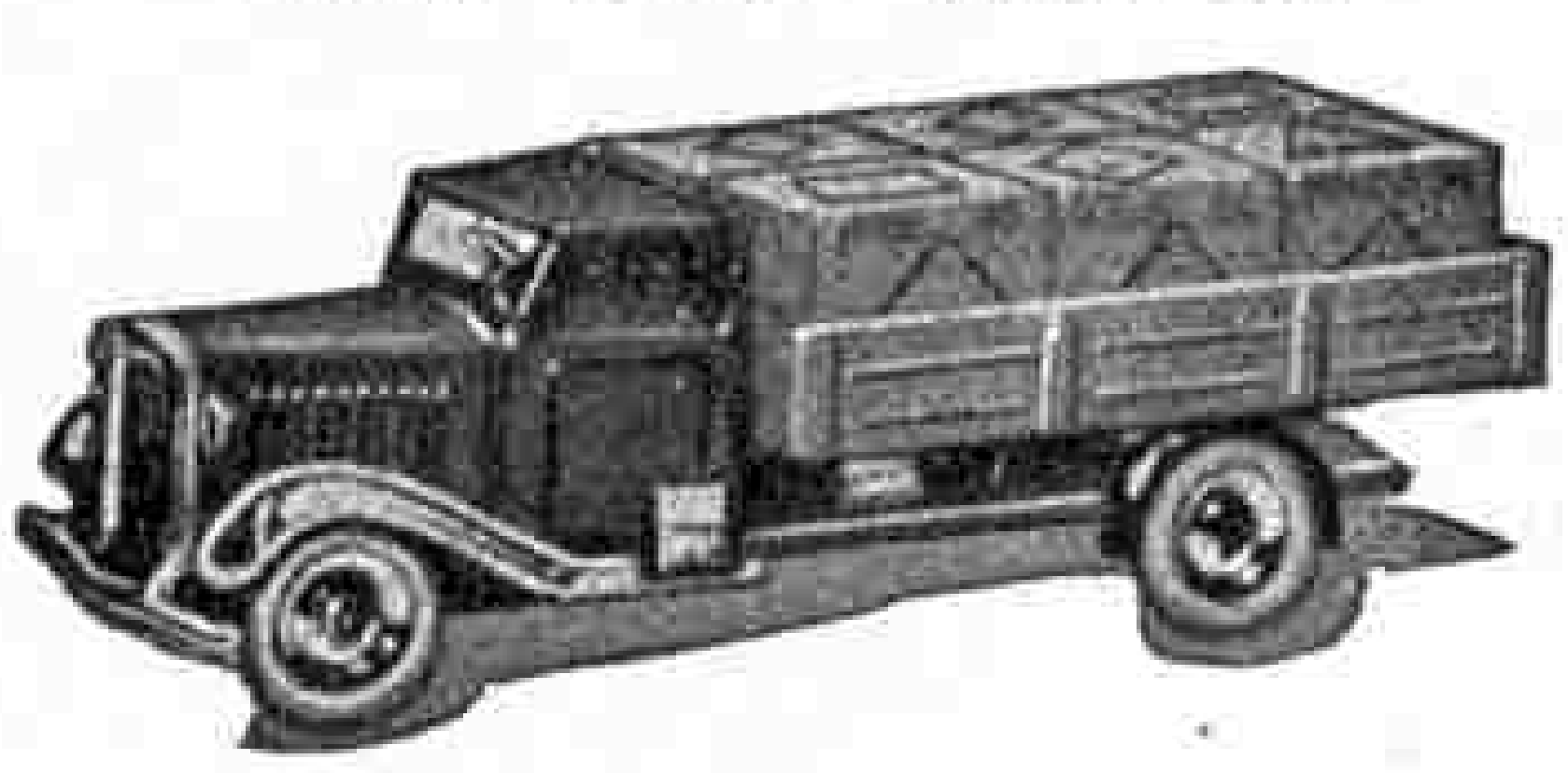

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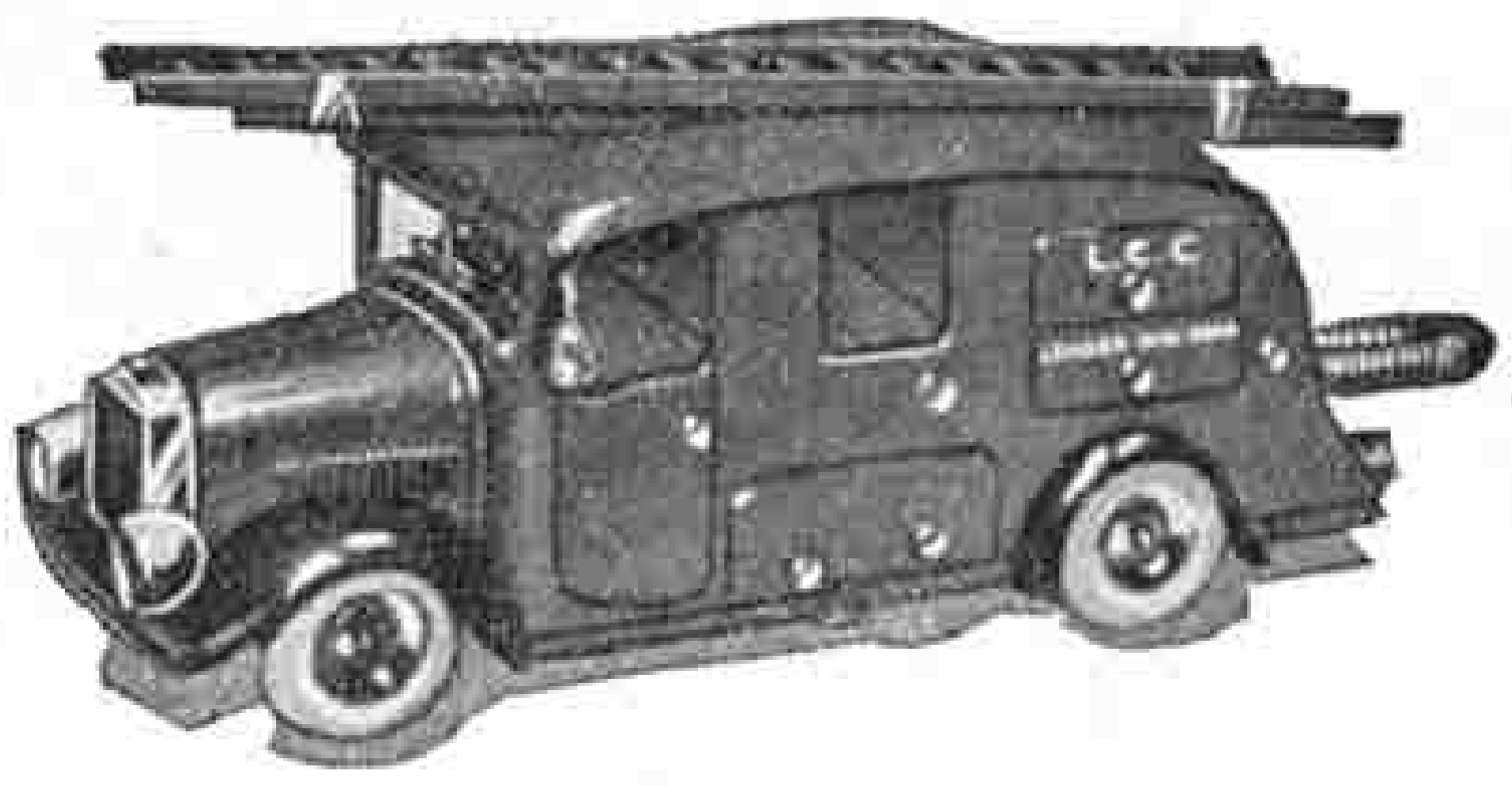

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MECCANO MAGAZINE

Editorial Office:
Binns Road, Liverpool 13
England

Vol. XXIII. No. 10
October 1938

With the Editor

Digging Up The Past

It was an inspiration on the part of the L.N.E.R. to bring the Stirling single-driver No. 1 of the former G.N.R. out of the Railway Museum at York, and to put it at the head of coaches used on "*The Flying Scotsman*" of 50 years ago as a contrast to the new stock recently introduced for that train. Crowds flocked to see the old train in action once more, and so much interest was aroused that special excursions were arranged for it, and the engine itself has been sent out on a tour of the principal L.N.E.R. centres.

The popularity of this 50-year old train on its reappearance has afforded proof that people who are not sufficiently interested in railways to read their history are irresistibly attracted when they are brought face to face with actual relics. Another example of this was provided by the Exhibition held last month at Euston in connection with the Centenary of the London and Birmingham Railway, the story of which is the subject of an article on page 552 of this issue. The principal features of the Exhibition were locomotives of earlier days on the L.M.S., including "*Lion*," the famous engine built in 1838 that normally is to be seen in Lime Street Station, Liverpool, together with rolling stock that included saloons built nearly 100 years ago for Queens Adelaide and Victoria. It was visited by immense crowds, and these included many people of the very last type one would have expected to display interest in railway matters.

A scene from Cowper's famous poem "John Gilpin" painted on a shed at Finchingfield, Essex. The painting was made about 100 years ago. Photograph by P. H. Lovell, London S.E.22.

The Table Went Round and Round!

I think my readers will be interested in the following story, which comes from the L.M.S. The unusual event described in it happened at Garsdale Station, which is on the main line between Leeds and Carlisle, and in one of the wildest and highest parts of Yorkshire. It is claimed to be England's windiest station, and one night, while a terrific gale was blowing, the turntable there refused to keep still, going round and round with a locomotive on it practically throughout the night, blown by the wind! Eventually it was brought to a stop by throwing large quantities of ballast into the pit. The turntable will not go round and round again, however, for it is now surrounded by a wooden fence to protect it from the wind.

Garsdale is lonely as well as windy. There is only one small shop near the station, and the L.M.S. grant free passes each week to the wives of the railwaymen who work there to enable them to do their shopping at Hawes, six miles away, or Settle, 20 miles away.

This Month's Issue

A particularly interesting article in this month's issue explains how an American railway deals with the cotton crop of the Southern States, and another contribution of great railway interest describes a footplate trip on the famous L.N.E.R. streamlined engine "*Sir Nigel Gresley*." There is also the story of the strange effect of the New Zealand earthquake of seven years ago, which actually transformed a lagoon into dry land.

"*Road and Track*" on pages 568-9 describes how Mr. John Cobb created a world's record of 350.2 m.p.h. in his "*Railton*" car on the Bonneville Salt Flats. This famous speed course was the scene of a keen duel between Mr. Cobb and Capt. G. E. T. Eyston, who later raised the record to 357.50 m.p.h.

I have in preparation many other fascinating articles on subjects in which all readers are interested. Many of these will be included in the November issue, which will be larger and even better than the present one, and those who have not yet placed their orders for the Magazine should not delay any longer. Otherwise they may find themselves unable to obtain a copy.

Moving the United States Cotton Crop

Scenes on the Illinois Central Railway

THE Southern States of America are traditionally associated with cotton plantations, and the real claim to fame of the Mississippi delta lies in its production of fine cotton. Cotton grows on a small shrub or bush. The fruit of the plant resembles a filbert nut, and from this the cotton breaks out as a downy substance. Picking is carried out in the Autumn, and the seed is separated from the cotton by means of a machine known as a cotton gin. The next process is that of compressing the cotton into bales, when it is ready for transportation to the mills where the spinning processes are carried out, or for shipment abroad.

Picking cotton in one of the larger cottonfields near Memphis, Tennessee. For the photographs and the information in this article we are indebted to the Illinois Central System, U.S.A.

The ginning process compresses the cotton into what is known as a gin-compressed bale, which weighs approximately 500 lb. In this state it forms a bulky package that would require a considerable amount of room in railway vehicles. In order to save space, therefore, the gin-compressed bales before rail transport are compressed still further. In this form the cotton becomes known as "standard density," and as such is used and accepted by American mills where storage space is also a consideration. Cotton for export is compressed to a higher density still, and this permits of better stowage on board ship.

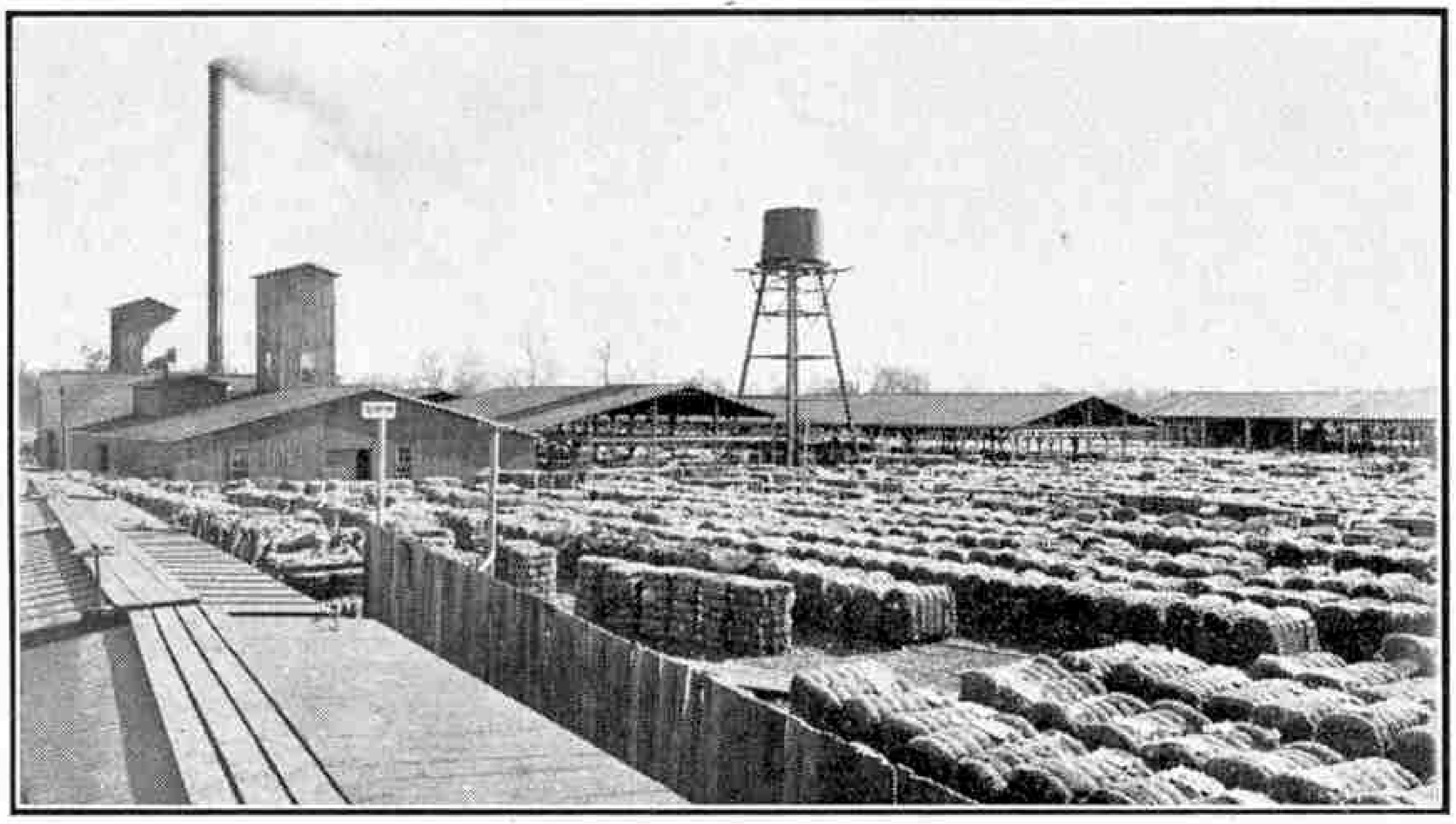
After picking and ginning to separate the seed the cotton is compressed into bales. Here a load of bales is shown on the way to market at Greenville, in the Mississippi Valley.

The uses of cotton are extremely varied. In one mill it may be used for the manufacture of rough cotton goods, such as cotton duck and denims. In another mill it will be used for the manufacture of fine cotton goods, such as broadcloth and motor tyre fabrics requiring cotton of extra strength and length. It is therefore divided into many grades according to the purpose for which it is required. The standard quality is known in the trade as "middling," and the grades above and below this standard vary in the strength and quality of the fibre, its colour, and its freedom from other substances. Rain during the picking season spoils the clear white colour of cotton, and poor picking and ginning have a similar effect and also reduce its condition. The best grades are the long-staple cottons in the Mississippi delta; the quality of the fibre is better, and its length is greater, than that of any other cotton.

Cotton is known to Americans as the money crop of the South, and its transport is a matter of special importance. The vast cotton-producing areas in Western Tennessee, Mississippi and Louisiana are served by the Illinois Central System, which runs from Chicago to New Orleans, forming the most important transport link between the Great Lakes and the Gulf of Mexico. It serves 14 States, and deals with approximately one-fifth of the cotton production of the Southern States. Memphis, in Tennessee, the largest inland market for cotton, is served by the Illinois Central; New Orleans, the second port in the United States, is the largest port market for cotton traffic. Our cover this month shows an ocean-going freighter being loaded up with cotton at the Stuyvesant Docks, New Orleans, where the Illinois Central owns elevators and warehouses equipped with modern loading and unloading plants. The terminal facilities there are among the finest in the United States, and they have been developed with great care and expense.

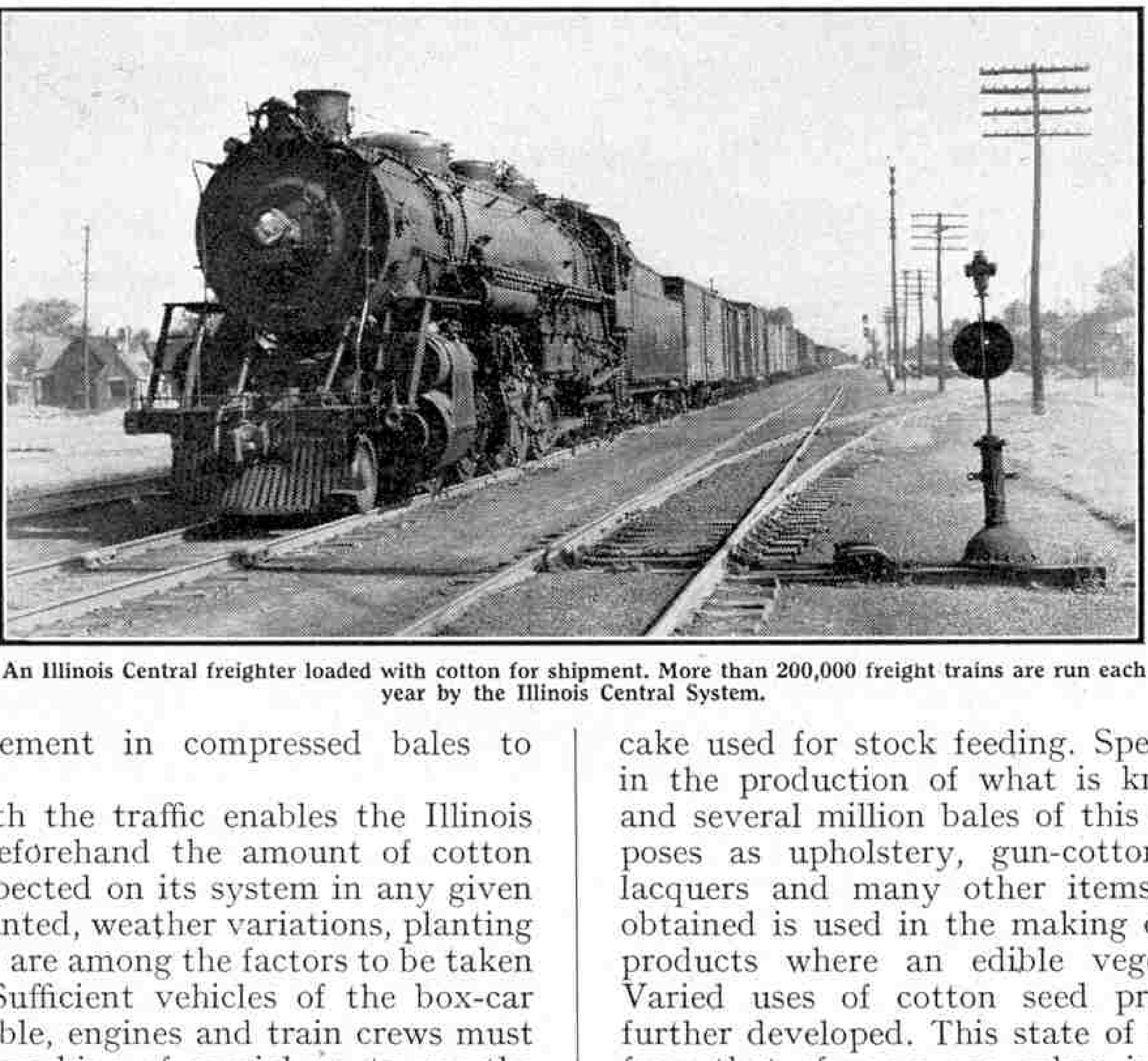
The growing and marketing of cotton entered strongly into the early history of the southern sections of the Illinois Central System. One of the prime reasons for building the first portion of its Southern lines, the New Orleans, Jackson and Great Northern, was to make it possible for cotton merchants of New Orleans to reach cotton-producing areas in the Mississippi and to ensure the export of cotton through that port. Earlier the lack of facilities for transport had caused the abandonment of a scheme for developing an area of 2,000,000 acres in the Mississippi delta, one of the most fertile areas in the world. Now, however, the production of well over 900,000 bales represents a season's yield in raw cotton alone. The largest crop so far recorded was that for the season 1925-26 when 969,000 bales were produced.

The important part played by the Illinois Central in the development of the cotton trade may be judged from the fact that on its system there are located 49 compresses and warehouses where cotton is placed in storage, compressed and made up into consignments for transport by rail to mills throughout the United States and Canada, and to the ports for export. The compresses and warehouses form an important link in the production and marketing of cotton, and the large number of these plants situated on the system are the result of the fact that there are more grades of cotton produced in Illinois Central territory than in that of any other railway.



In the storage yard at one of the many compresses on the Illinois Central System. Thousands of bales of cotton are waiting for transport by rail to the mills, or to the seaboard for shipping overseas.

The volume of traffic and its peculiarities makes necessary special measures for the handling of the traffic. Some of the big plantations in Mississippi have a production as high as 10,000 bales in the season. At the other end of the scale there is the small farmer who produces perhaps five bales or so. Each consignment from these different sources may require to be moved to many different destinations, and the particular grade of cotton required by certain mills may be produced on several different plantations and farms.



An Illinois Central freighter loaded with cotton for shipment. More than 200,000 freight trains are run each year by the Illinois Central System.

A further point is that large buyers and cotton merchants may desire to concentrate their stocks of different grades of cotton stored at various compresses at a central warehouse. The cotton therefore has first to be moved from the point of origin to the compresses; and then it requires further movement in compressed bales to the warehouse.

Long familiarity with the traffic enables the Illinois Central to estimate beforehand the amount of cotton traffic that may be expected on its system in any given season. The acreage planted, weather variations, planting and growing conditions are among the factors to be taken into the calculation. Sufficient vehicles of the box-car variety must be available, engines and train crews must be provided, and the working of special or, to use the American term, "extra" trains must be allowed for in order to make sure that the traffic is dealt with promptly and efficiently. Incidentally a box-car load will consist of approximately 100 bales of cotton compressed to standard density, or 130 bales if the cotton has been still further compressed for export. Weather conditions naturally require careful study. In the 1937 season, for instance, dry weather set in during the maturing season, and deterioration of the traffic seemed inevitable; suddenly conditions improved, and a splendid picking, ginning and marketing season was enjoyed.

An important factor in the working of the traffic is that the Illinois Central in traversing the Mississippi Valley secured a comparatively straight and level route. Of the original road in Illinois some 90 per cent. was straight, and what few curves there were could be laid out to a large radius. Long and heavy trains can therefore be operated easily and speedily. The owning of port facilities, too, is of considerable advantage in connection with shipment traffic, for consignments can be dealt with throughout from the compresses and warehouses to the ships' sides.

In addition to the carriage of cotton itself there are other branches of the traffic that bring business to the railroad. Fertilisers and other supplies in connection with planting and growing and the by-products of cotton need transport. Years ago the cotton seed separated in the ginning process was only of use for replanting purposes, although some of it was considered valuable as a fertiliser to a certain extent. Now at different points on the Illinois Central System there are located cotton oil mills, where the cotton seed kernels are ground into meal and cake used for stock feeding. Special machinery is used in the production of what is known as cotton linters and several million bales of this are used for such purposes as upholstery, gun-cotton and as a base for lacquers and many other items. The cotton seed oil obtained is used in the making of fine soaps, and other products where an edible vegetable oil is suitable. Varied uses of cotton seed products are being still further developed. This state of affairs is very different from that of years ago, when in some States the laws required any excess of cotton seed to be burned.

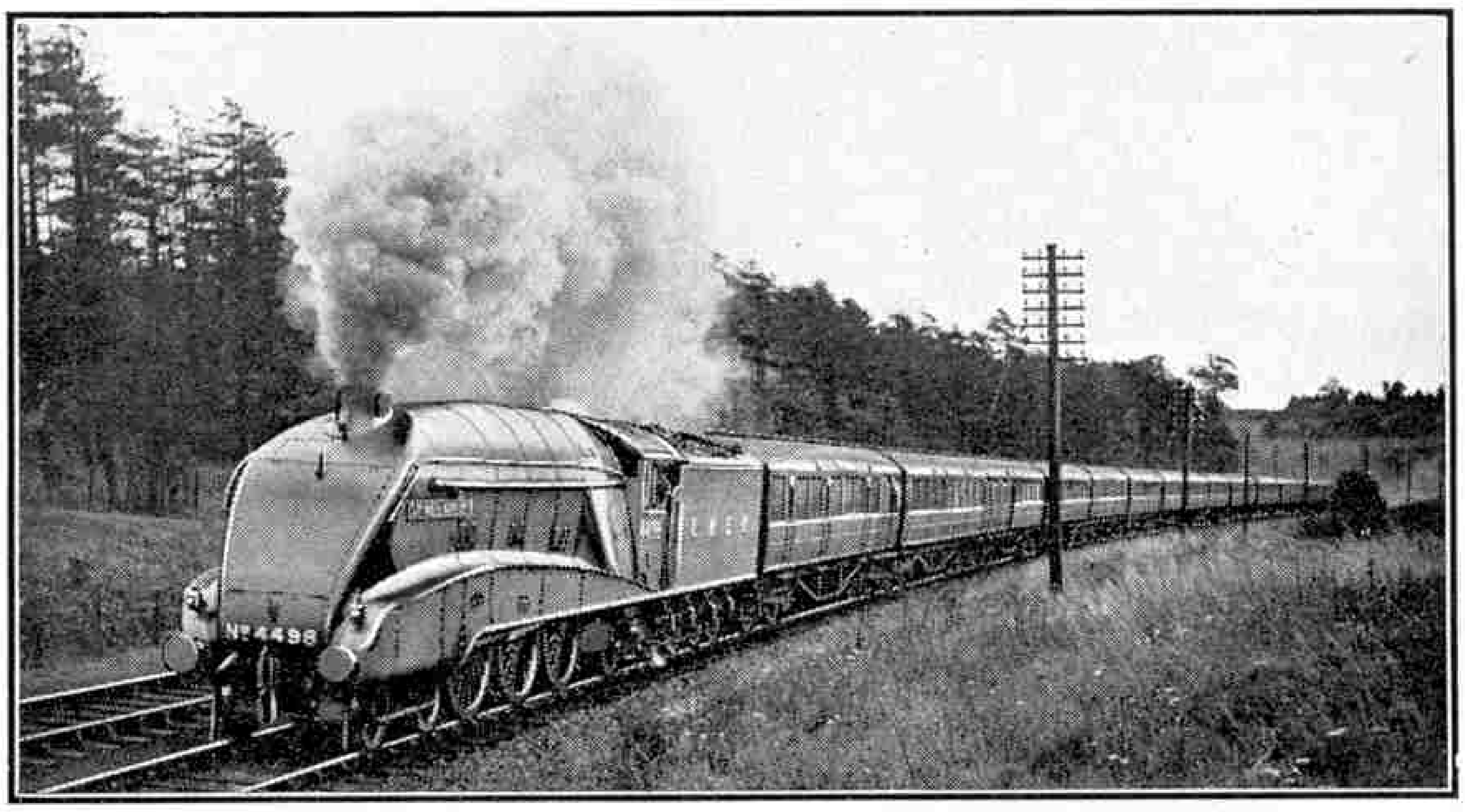
A Famous Streamlined Locomotive

On the Footplate of "*Sir Nigel Gresley*"

By a Railway Engineer

FEW locomotives have captured popular fancy to a greater degree than the Class "A4" "Pacifics" of the L.N.E.R. They were the first fully streamlined engines to be built in this country, and although the shrouding covered up a great deal of the motion, and so took away much of the fascination inherent in the sight of powerful machinery in motion, the striking novelty of the outer casing and its queer shape gave a touch of mystery to the engines. Great things were expected of them, and when, barely a month after being turned out of Doncaster works, "*Silver Link*" attained 112½ m.p.h., their fame was assured. But because their wonderful reputation was made primarily on "*The Silver Jubilee*" express, many people got the impression that they were high-speed engines pure and simple, and that on the heavy Anglo-Scottish expresses they were little superior to the "Pacifics" and "Super-Pacifics" that had preceded them.

Now that the type has been multiplied, the majority of the East Coast expresses are regularly hauled by "A4s," and their performances with 500-ton loads are in some ways even more impressive than the spectacular feats achieved with the more moderately weighted streamlined trains. The first additions to the original four silver engines were turned out in standard L.N.E.R. green, and these were followed by the five "Dominion" engines, in Garter blue, for the "*Coronation.*" But there is a degree of inconvenience in having silver, green, and blue engines, as they cannot always be confined to their own special services; to secure the maximum interchangeability blue was adopted for all the "A4s."


"Sir Nigel Gresley" at the head of the 5.45 p.m. Newcastle express from King's Cross on the run described in this article. This photograph and the lower one on the opposite page are by Mr. E. R. Wethersett.

On a recent journey by the 5.45 p.m. express from King's Cross to Darlington I was privileged to ride on the footplate for part of the run; our engine was the best known of the whole stud, No. 4498 "*Sir Nigel Gresley.*" Even in the quietest traffic periods the 5.45 p.m. is a difficult train to work, as some of the intermediate timings are very tight, and the load out of King's Cross is rarely less than 14 coaches. But ordinarily this includes a portion for Hull, so that the load is lightened by two or three coaches north of Doncaster. On the occasion of my trip, however, traffic was so heavy that the Newcastle portion alone consisted of 15 coaches. The Hull coaches were run separately as a second portion, and so there was no respite whatever on the northern section of the run. The actual load was 474 tons tare, and 510 tons with passengers and luggage. No. 4498 was in charge of Driver Burfoot, of King's Cross shed, who, as I described in the "*M.M.*" for September 1937, made such a splendid run on the trial spin of the "*Coronation*" express last year; his run it will be remembered included a top speed of 109 m.p.h. On my trip his mate was Fireman Pearce.

The exterior of a locomotive may be streamlined or not, but there is no changing the cab. Riding on the footplate and looking out through the front glasses one is scarcely conscious of the streamlining, except to note how efficiently that peculiar wedge-shaped front throws the exhaust steam clear of the cab. The "A4s" have the standard Gresley regulator, with two handles, one on either side of the cab, and also the vertical column reversing gear; this latter is a beautifully easy appliance to manipulate, requiring none of the brawn needed with some older pattern lever gears. Bucket seats for the driver and fireman were first fitted on the "A4s," but now all the L.N.E.R. "Pacifics" have been so equipped. Apart from the canopy that covers the air-pocket between the engine and the front of the tender, there is scarcely any difference between the layout of the fittings on the "A4s" and on the ordinary "Super-Pacifics" of Class "A3." The streamliners, however, are all fitted with a recording speedometer. This appliance is mounted underneath the fireman's seat, in which position it can be read after dark quite easily in the light of the fire.

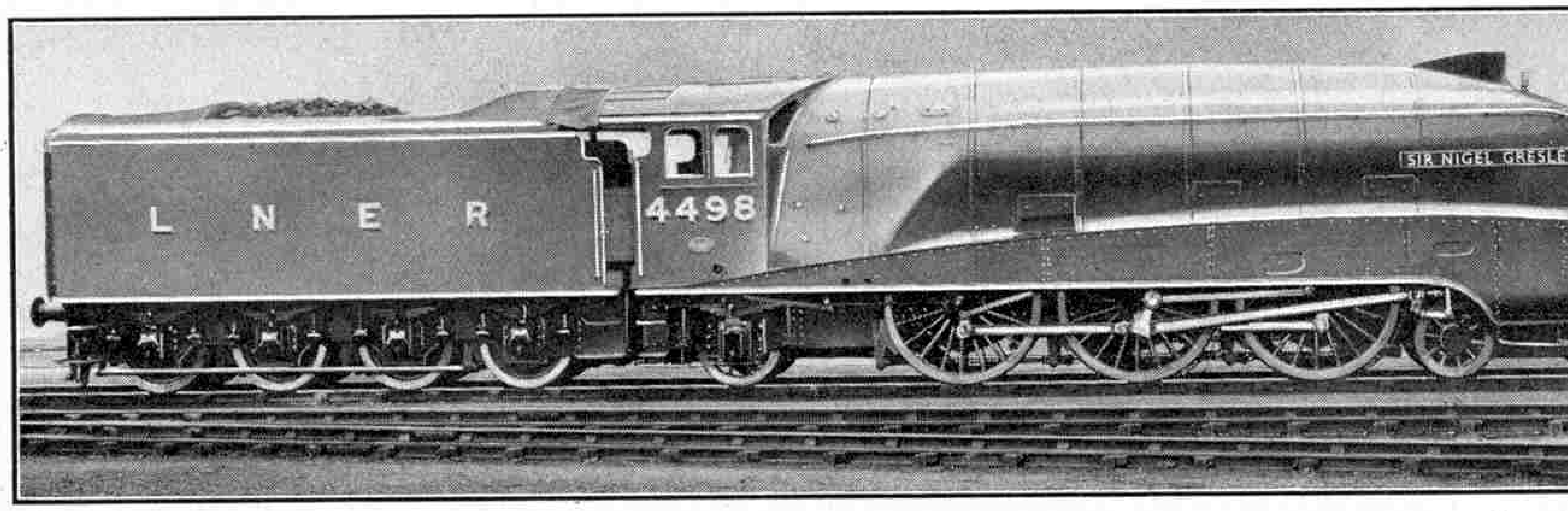
The schedule for the King's Cross–Grantham stage, 114 minutes for 105.5 miles, is not exceptionally hard by present standards, and we suffered a number of traffic delays. But after adverse signals at Potter's Bar and Welwyn North had made us two minutes late, there came a fine sprint, in which the 43.1 miles from Hitchin to Fletton Junction were reeled off in 34 min. 24 sec., at an average speed of exactly 75 m.p.h. We were going well too on the long climb to Stoke, but then came further delays, at Little Bytham and Corby. Fortunately we had a little time in hand, and with a smart recovery from the last of the signal checks we ran into Grantham just on time.

But it was from Grantham northward that the capacity of the engine was shown in so superb a light. Only 50 minutes are allowed for the 50.5-mile run to Doncaster, and with a permanent speed restriction to 55 m.p.h. through Retford, where speed normally would be 80 m.p.h. or over, it needs some very smart work with a 510-ton load. We made a beautifully clean start, and by the time we breasted the second mile post out of Grantham, and the beam from the colour-light signal at the entrance to Peascliffe Tunnel grew into a piercing shaft of green light, No. 4498 was linked up to 15 per cent. cut-off. This is just one-fifth of full gear, yet it was the normal running position for most of the trip.

Just inside the tunnel the descent to the Trent Valley begins. We emerged accelerating quicker than ever. Barkston, 4.2 miles out, was passed at 62 m.p.h., Hougham at 75; and even now that the regulator was pushed back a little we knocked up a merry 82 m.p.h. past Claypole. In spite of this favourable length the initial timing of 15 minutes for the 14.6 miles from Grantham to Newark takes some doing, and we swept through at 79 m.p.h. only 13 sec. to the good. We were easing, too, for the passage over Muskham troughs. Water was picked up at just over 70 m.p.h., and then, with the regulator full open again, "*Sir Nigel Gresley*" buckled to it with tremendous vim.

There was a time, not so many years ago, when 60 m.p.h. was considered good going on the level with any load much over 400 tons; but nowadays there seems no limit to what we may expect from the "A4s." Here, across the dead flat of the Trent Valley, No. 4498 accelerated from 70 to the astonishing speed of 77½ m.p.h. in a little over four miles. We began the rise to Askham Tunnel in wonderful style; in the first mile or so the drop in speed was barely perceptible, but the driver was taking no chances. When half-way up the first 1 in 200 pitch cut-off was advanced to 20 per cent. This took us through Dukeries Junction at the unusually high rate of 62 m.p.h.—after four miles of climbing—and now, although the grade was easing slightly, cut-off was further advanced, to 25 per cent., to take us over the final hummock past Markham signal box.

A cut-off of 25 per cent., if used continuously with a wide open regulator, would be moderately hard going on a big engine, but these short spells, judiciously timed, made very little extra demand on the boiler, and yet were saving whole minutes in running. For the response of No. 4498 to the longer cut-off was really startling, and we stormed over Markham summit at 64 m.p.h. The gear was quickly linked up to 15 per cent. again, and almost as quickly we were racing downhill at 82 m.p.h.; but steam was shut off now, and

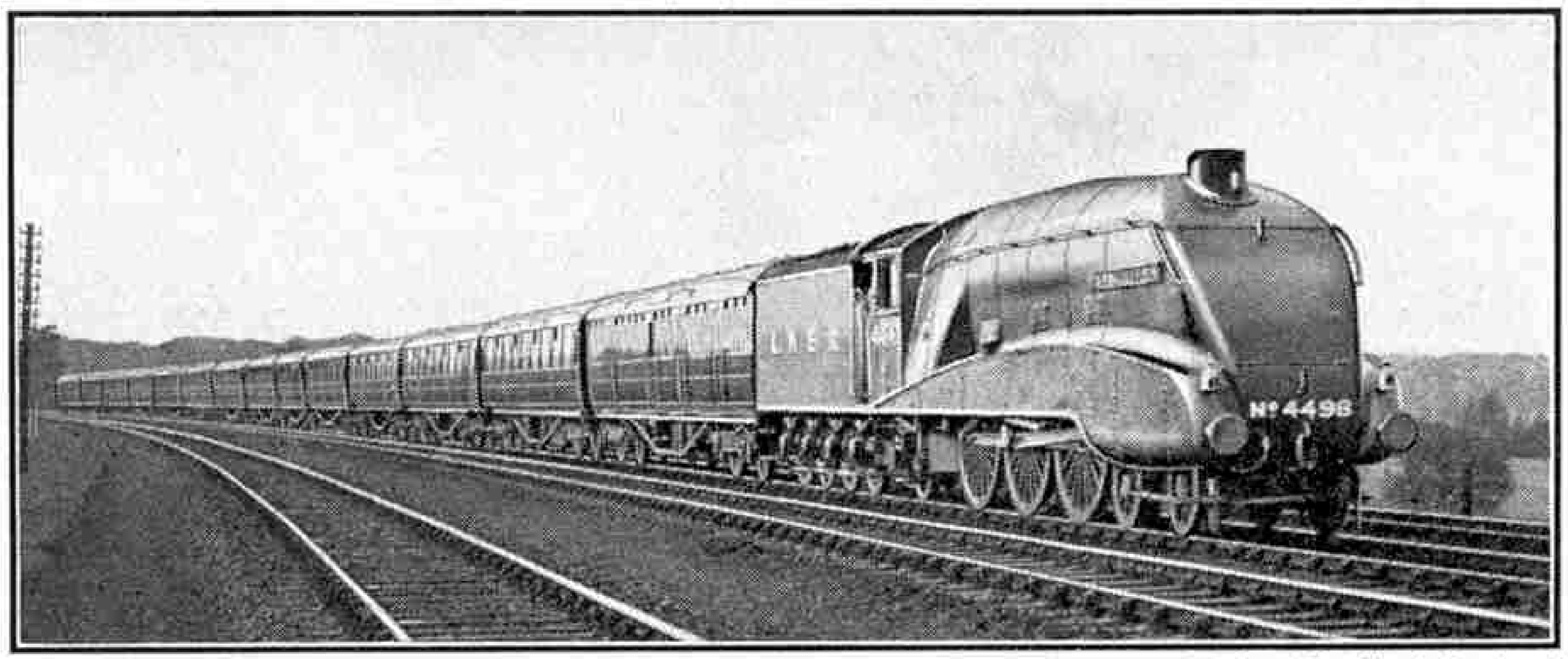


L.N.E.R. No. 4498 "Sir Nigel Gresley," the hundredth Gresley "Pacific" locomotive to be built. A splendid Gauge OO model of this engine is introduced in the new Hornby-Dublo Railway System described on page 554. Photograph by courtesy of the L.N.E.R.

Burfoot, with an occasional glance at the speedometer, was making gentle applications of the brake in readiness for the slack through Retford. We came down well below the limit, to a little under 50 m.p.h., and passed through the station, 33.1 miles from Grantham, in 30¾ minutes.

Then we streaked away to 75 m.p.h. on little easier than level road near Scrooby troughs. The 3-mile rise to Piper's Wood was taken flying. At Bawtry, half-way up, there came again that magic turn of the reversing screw, and with cut-off thereby increased from 15 to 20 per cent. "*Sir Nigel Gresley*" took his big load of 510 tons fairly sailing over the summit at 67 m.p.h. We touched 77½ m.p.h. on the down grade through Rossington, and were past Black Carr Junction, 47.7 miles from Grantham, in exactly 44 minutes. Steam was shut off now, and slowing all the time we ran past miles of sidings and seemingly endless coal trains. At the locomotive running sheds, over on our right, in the dusk one recognised the familiar shapes of "Atlantics," "Pacifics," "Green Arrows," streamliners and many more. A minute later we were entering Doncaster station to stop in the brilliant time of 48¾ minutes, a start-to-stop average speed of 62¼ m.p.h. over the 50.5 miles from Grantham.

There is little respite on the next section especially as we were continuing without any reduction in load. For 10 miles the line is dead level, and here it was extremely interesting to note just how rapidly the engine gathered speed. Burfoot linked up, bit by bit, his adjustments being made in inverse ration to the rise in speed. Two miles out we were doing 50 m.p.h.; in another two speed was up to a mile a minute, and in ten miles from Doncaster we attained a full 75 an hour. In the next four miles, although the country remains as flat as the proverbial pancake, there are three little hummocks, where the railway crosses in succession the Knottingley and Goole Canal, the line from Hull to Wakefield, and the River Aire. Each of these involves a modest rise above the level of the surrounding country, and the longest adverse pitch, three-quarters of a mile at 1 in 270, pulled us down to 71½ m.p.h. But once to the dead flat again north of Templehirst "*Sir Nigel Gresley*" developed the finest bit of speeding on the whole trip by attaining 79 m.p.h.



A train of new vehicles provided for "The Flying Scotsman" service this year, hauled by "Sir Nigel Gresley." This photograph was taken on a special run before the new train went into regular service.

So we passed Brayton Junction, 17.0 miles from Doncaster, in the remarkably short time of 17 min. 35 sec. Approaching Selby signals were against us, but in response, it seemed, to our musical chime whistle, the "distant" was pulled off, and the check did not cost us more than half a minute in running, as we were in any case preparing to slow down for the usual 30 m.p.h. slack.

In passing, it is interesting to note the variety of signals met with on this run. In the Southern Area the old Great Northern somersault type are rapidly being replaced by standard upper quadrant semaphores; there are colour lights at many points, and here, in the North Eastern area, the very distinctive lower quadrant signals of the former N.E.R., which work in a slot in their wooden post, are much in evidence.

We were through Selby, 18.4 miles from Doncaster, in 20¼ minutes, and then with regulator wide open and the valves cutting off at 35 per cent. we roared out across the swing bridge over the Ouse and round the great curve beyond. A backward look from the footplate revealed a seemingly endless chain of lighted windows as our 15-coach train came winding round behind us. In the meantime Burfoot was linking up step by step, and by the time we swung over Barlby Junction, not more than three-quarters of a mile beyond Selby, No. 4498 was working on 15 per cent. cut-off once more. This stretch of road is definitely against the engine. There is nothing that could be termed a "bank," but a succession of short lengths graded at 1 in 222, 1 in 228, or so come one after the other, and culminate in the 2-mile rise at 1 in 390 to the second crossing of the Ouse, at Naburn swing bridge.

Four miles beyond Selby we were doing a mile a minute. Escrick was passed at 66 m.p.h., and we cleared Naburn bridge at 70 m.p.h. The slowing up for York, however, begins a full 2 miles out, with the preliminary slack over Chaloner's Whin Junction. We were past this point, 30.2 miles from Doncaster, in 32½ minutes, but as we neared the great gantry that spans the tracks by Holgate excursion platforms our own particular signal showed red, until we were within a hundred yards of it. Then the arm was pulled off, and there flashed up an illuminated letter M. This was one of the new multiple-lamp route indicators, recently installed, that aptly foreshadow the coming resignalling of York station throughout with colour-light signals. We ran gently through to the north end of the station, and in spite of the final check, and the slight one at Selby, drew up in 36¾ minutes from Doncaster, just inside the sharp 37-minute booking. Our net time for the 32.2 mile run was 35¾ minutes, and considering that this particular schedule is designed for a train-load of about 400 tons No. 4498 had done splendidly indeed.

On the last stage I travelled in the train, a contrast indeed in smoothness and comfort. After stowing away my overalls and cleaning up generally I resumed timing, to find that No. 4498 and her crew were carrying on in the same brilliant style. We were doing 70 m.p.h. in just ten miles from York, and against the faintly rising nature of the road attained a full 75 an hour at Sessay. Then unfortunately there came a very bad signal check, approaching Thirsk, which cost us nearly 5 minutes in running. Nevertheless speed was recovered well, and with a glorious sprint over the final 14 miles from Northallerton, the 44.1 miles from York to Darlington were completed in 47¾ minutes, less than a minute outside schedule. Our net time indeed was not a second over 43 minutes, and as I waved farewell to the enginemen, and watched the train leave for Newcastle, I felt that one could scarcely wish for a finer example of British locomotive performance. My mind went back to a previous trip behind "*Sir Nigel Gresley,*" which I described in the "*M.M.*" for August of this year. Then this splendid engine regaled us by a glorious burst of speed between Grantham and Peterborough, touching 94 m.p.h. and continuing for 10 miles at an average of 89.8 m.p.h. with a 510-ton train.

Land Created by Earthquake

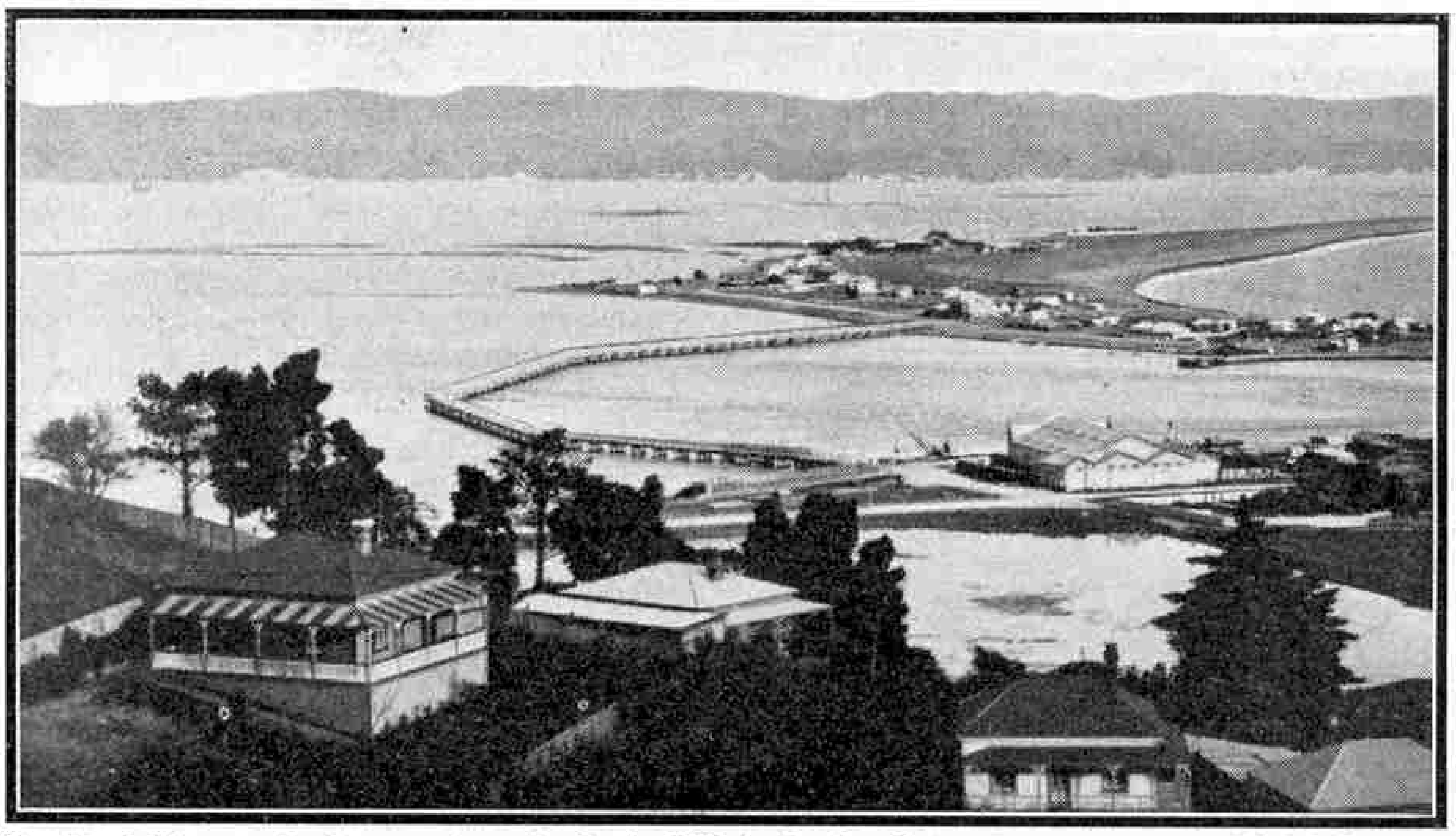
A New Zealand Transformation

By V. May Cottrell

EARTHQUAKES are seldom beneficial in the after-effects upon the localities they visit; almost invariably they prove purely destructive agents, to a minor or major degree, according to their duration and severity. The great earthquake of 3rd February 1931, which in the space of a few seconds completely shattered the flourishing sea-port town of Napier, New Zealand, is a noteworthy exception to this general rule.

I was privileged to tell the story of this appalling visitation, and its distressing results, and also of the building of the beautiful modern city that speedily arose from the ruins of the old Napier, for the *"Meccano Magazine,"* in November 1931 and August 1933. The earthquake bestowed its great gift upon Napier even as it destroyed her, during those few terrible seconds of its maximum strength and ferocity when, owing to some gigantic subterranean upheaval, it raised the whole level of the land in and around Napier to heights ranging from 3 ft. to 8 ft.

This amazing gift consists of a huge block of now fertile land, 7,500 acres in extent; an area one and a half times that of the Principality of Monaco, and over twice as large as all the parks of London combined. Prior to the earthquake this land was sea-bed covered with salt water up to 10 ft. or more at high tide. It was known as the Ahuriri Lagoon, a great tidal arm of the sea into which the Tutaekuri River emptied itself. This large lagoon was the home of pleasure craft of all descriptions, and numerous week-end houses and shacks lined its shores. To those of us who boated, swam and fished there for years, and watched gorgeous sunsets flame across its broad waters ringed by rolling hills, these extensive plains are a never-ending source of astonishment.



The Ahuriri Lagoon, Napier, seen from the Napier Hills in the days before the earthquake of 1931. Where the lagoon was there is now fertile farmland twelve square miles in extent.

As the earth rocked and reeled beneath their feet, many residents on Napier's hills witnessed an amazing spectacle. They actually saw the sudden draining of the Ahuriri Lagoon when the whole land rose bodily during the giant upheaval, spilling the great bulk of its water into the Pacific Ocean never to return.

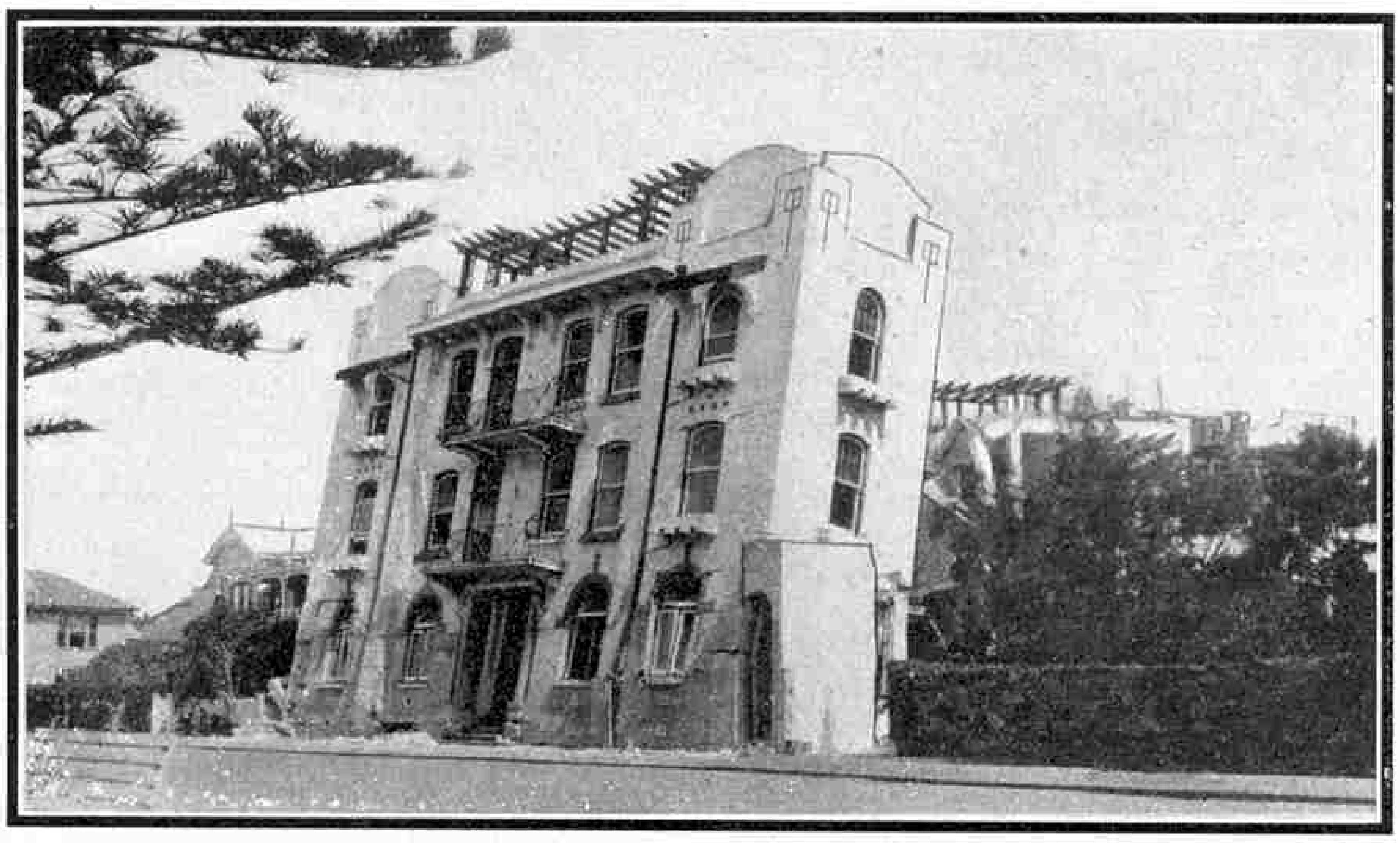
Before the true explanation of this strange phenomenon was realised, it was feared that this immense volume of water would return as a tidal wave and engulf the ruined town and its environs. This alarming supposition was strengthened when it was noticed that the ocean had receded considerably on all the surrounding beaches. Hence a very large majority of residents flocked to the hills for safety during the long, weird night of almost continual earthquake shocks of varying intensity. Those of us who brought our mattresses out of our badly damaged homes and lay on the dry ground to rest—but not to sleep—know that the earth never ceased to tremble and vibrate the whole night through.

Our street was lined with motor-cars filled with people who firmly believed the tidal wave theory. Every time there was an extra severe earthquake shock, about every half hour, we heard all the car doors open amid screams and cries as their terrified occupants stumbled hastily out of the crazily rocking vehicles. Then, as the earth ceased its more violent heavings and prancings, for the time being, the car doors slammed shut all up and down the street and silence reigned while the brilliant full moon looked down as placidly as ever out of a cloudless sky. The succeeding wild contortions of the tortured earth, some of which were so violent as to cause tall trees to touch the ground, brought a repetition of the whole performance.

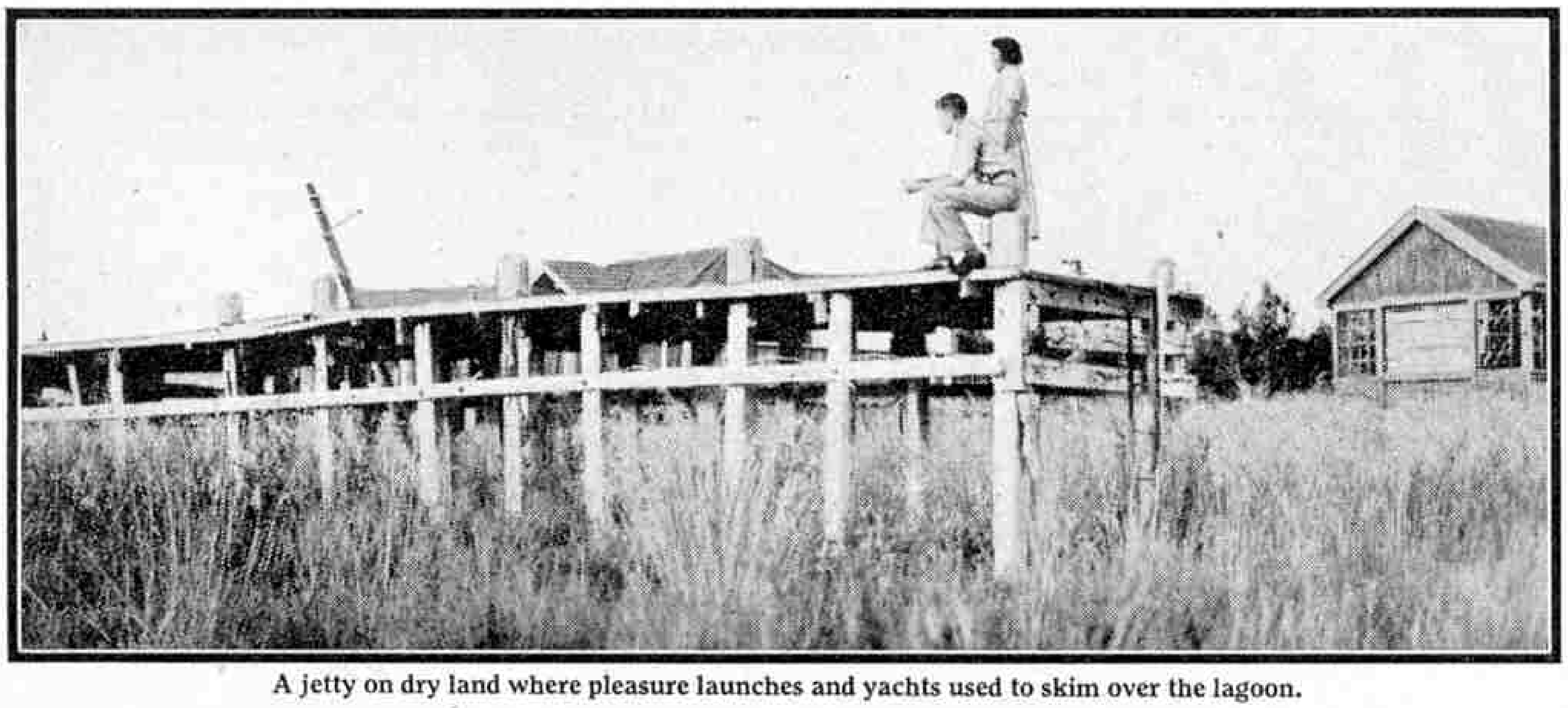
The first effect of the swift and wholesale draining of the Ahuriri Lagoon was the imminent danger of pestilence from the shoals of stranded fish, and the millions of decaying shell-fish left high and dry over the whole area. The stench from these was terrible during those hot summer days and nights following the earthquake. It was this grave menace to health, combined with the temporary collapse of the town water-supply owing to damaged mains, and the consequent failure of the sanitary system, which was responsible for the compulsory evacuation of the main bulk of the city's population of over 15,000. Some three or four months elapsed before the return of most of the women and children. Those of us who desired to return to our homes a few weeks after the earthquake only managed it by obtaining special permission to enter the stricken area.

The dry Ahuriri Lagoon, with its acres and acres of bleaching shells, was a depressing sight indeed at this time, and for long afterwards; especially to those of us who, for many years, had enjoyed the beauty of this large sheet of water in all its varying moods and from various aspects. Gone for ever from its broad bosom with the fleet of graceful yachts, a constant delight to the eye; the motor launches and smaller craft filled with gay pleasure seekers; the crowds of swimmers, and the trimly-fashioned, arrogant speed boats sending up showers of spray as they cut their way swiftly through the clear, glistening water.

The earth had scarcely ceased trembling, however, after the upheaval, before the surveyors were busily engaged in finding new levels preparatory to the drawing up of a scheme for the de-watering of low-lying portions and the permanent draining of surface water from the whole expanse. This area received the surplus rain water from much hilly back country, therefore a comprehensive drainage scheme was essential to cope with local rain water, as well as high country seepage during wet periods of the year. In addition to the gravitational drainage system, an electric pumping station was installed to de-water a large low-lying area, the water from which flows into the main outlet channel.


The front of Dr. Moore's Hospital, Napier, as it appeared after the earthquake. It was cracked and tilted backward by the shocks.

The work of reclaiming what for countless years had been sea-bed was begun in 1934. In that year the Public Works Department of the New Zealand Government undertook the vast task of draining and de-salting the area. This involved 11 miles of stop banks, 30 miles of main drains, and approximately 100 miles of lateral drains. The lateral drains were dug for the purpose of hastening the de-salting of the land. Great assistance was rendered at this time by the chemistry section of the Government Agricultural Department, which, by the analysis of some hundreds of samples of soil, was able to supply valuable data regarding the salt and other contents of the soil.


A jetty on dry land where pleasure launches and yachts used to skim over the lagoon.

This drainage system proved so successful that barely two years later, in 1936, over 1,200 acres had been ploughed. Some 280 acres of this was put down in permanent pasture, and 20 acres was sown in barley and oats. A further 750 acres was sown in temporary pasture, which served the dual purpose of providing grazing for stock as well as checking the growth of weeds.

Since that time the work of reclamation has gone on apace. At the end of last year the partially developed area was carrying some 4,000 sheep and 200 head of cattle. During the spring—September, October and November in New Zealand—a further area of 60 acres was prepared for experimental planting. On this a very varied assortment of crops have been grown successfully, comprising wheat, oats, lucerne, barley, mangolds, rape, kale, millet, maize, potatoes, kumeras, peas, pumpkins, soft turnips, silver beet, carrots, and other root crops. One of the most interesting of the experimental crops is an acre of asparagus, which looks remarkably well.

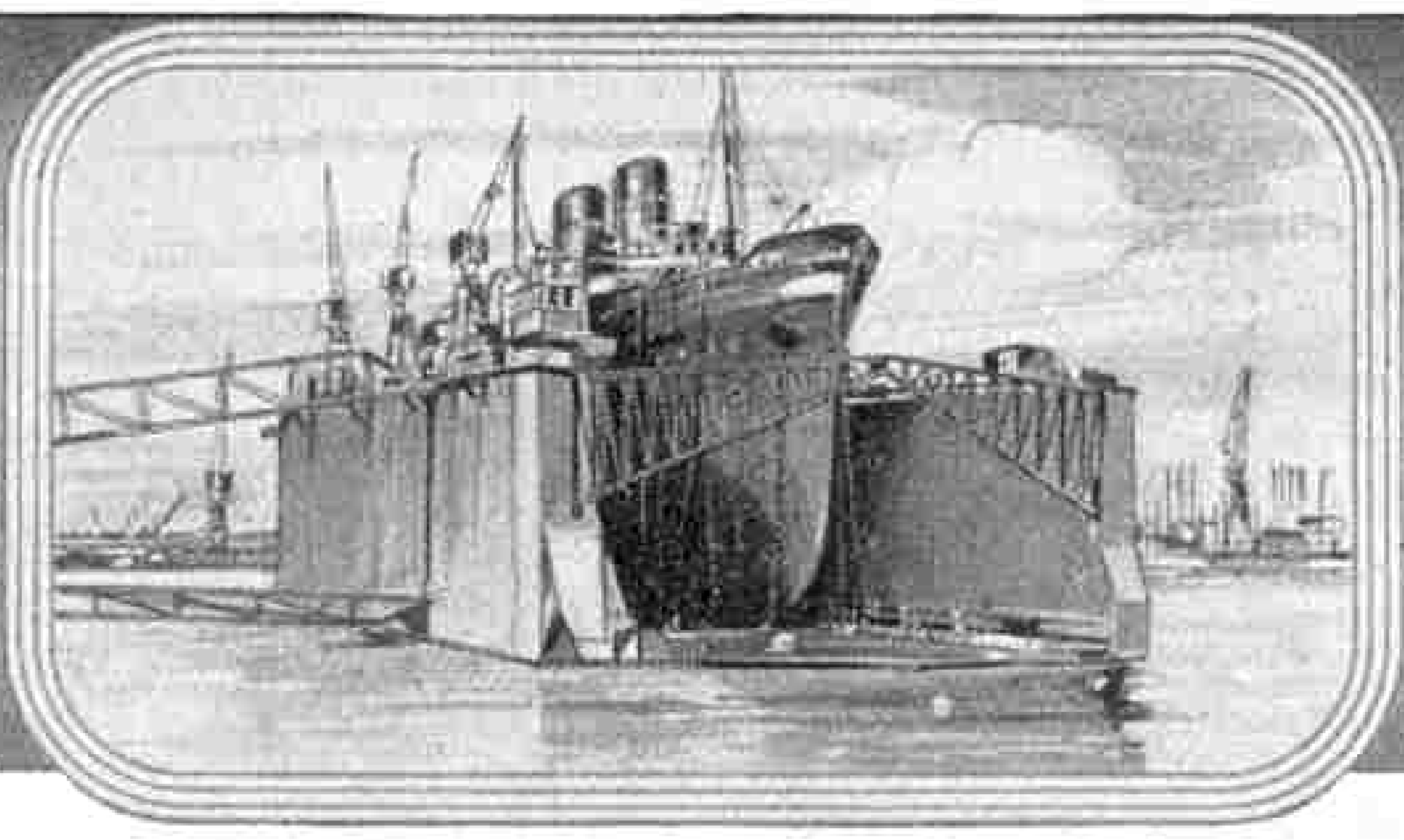
When fully developed it is estimated that the Ahuriri Lagoon will prove capable of wintering seven sheep to the acre, thus bringing the carrying capacity of this great new block of land at Napier's very doors up to somewhere about 52,500 head.

Over 36 miles of fences have already been erected; 24 miles of this is boundary fencing, now completed. The full extent of the fencing operations required for this large area may be gauged from the fact that when the fencing of the internal roads has been completed a total length of 95 miles will have been erected. If the land is later subdivided into small farm plots another 110 miles of fencing will be necessary, over 200 miles in all. Twelve miles of roadway has already been formed, some of which is metalled. A large acreage on the lagoon has been reserved as an airport. This required practically no levelling or other preparation, and it has been in constant use for some time, both for service and private aeroplanes.

It is believed that, when it is fully developed, the main area will support about 200 families, each following a profitable and healthy occupation. This will mean the building of an equivalent number of houses, involving the purchase of all the numerous household requirements, also farm implements, tools, plants, seeds and so on, as well as the extension of public services such as telephone, transport, water and electricity.

Thus within the space of a few years the earthquake's compensatory gift to Napier will prove an immensely valuable asset through the formation of a new farm settlement almost within the city boundary.

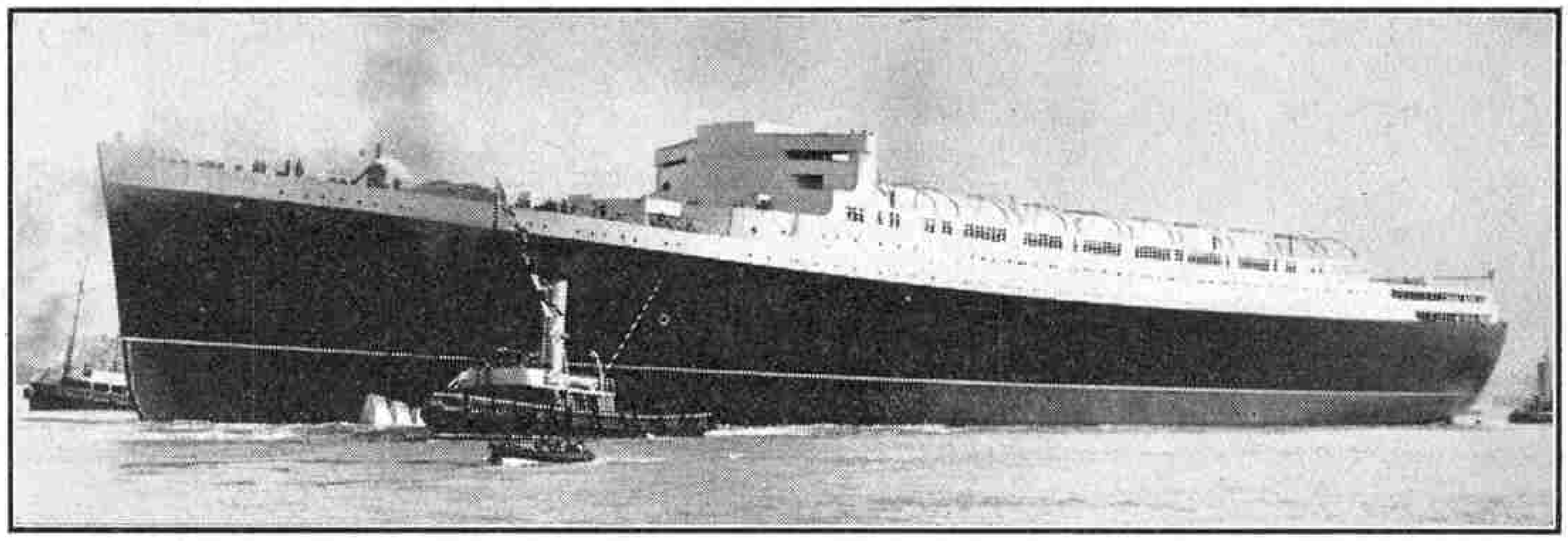
So out of what appeared to be unadulterated calamity, great and increasing good is coming to Napier as a direct outcome of the disastrous earthquake of 3rd February 1931.



SHIPPING NEWS

Vessels for Refuse Transport

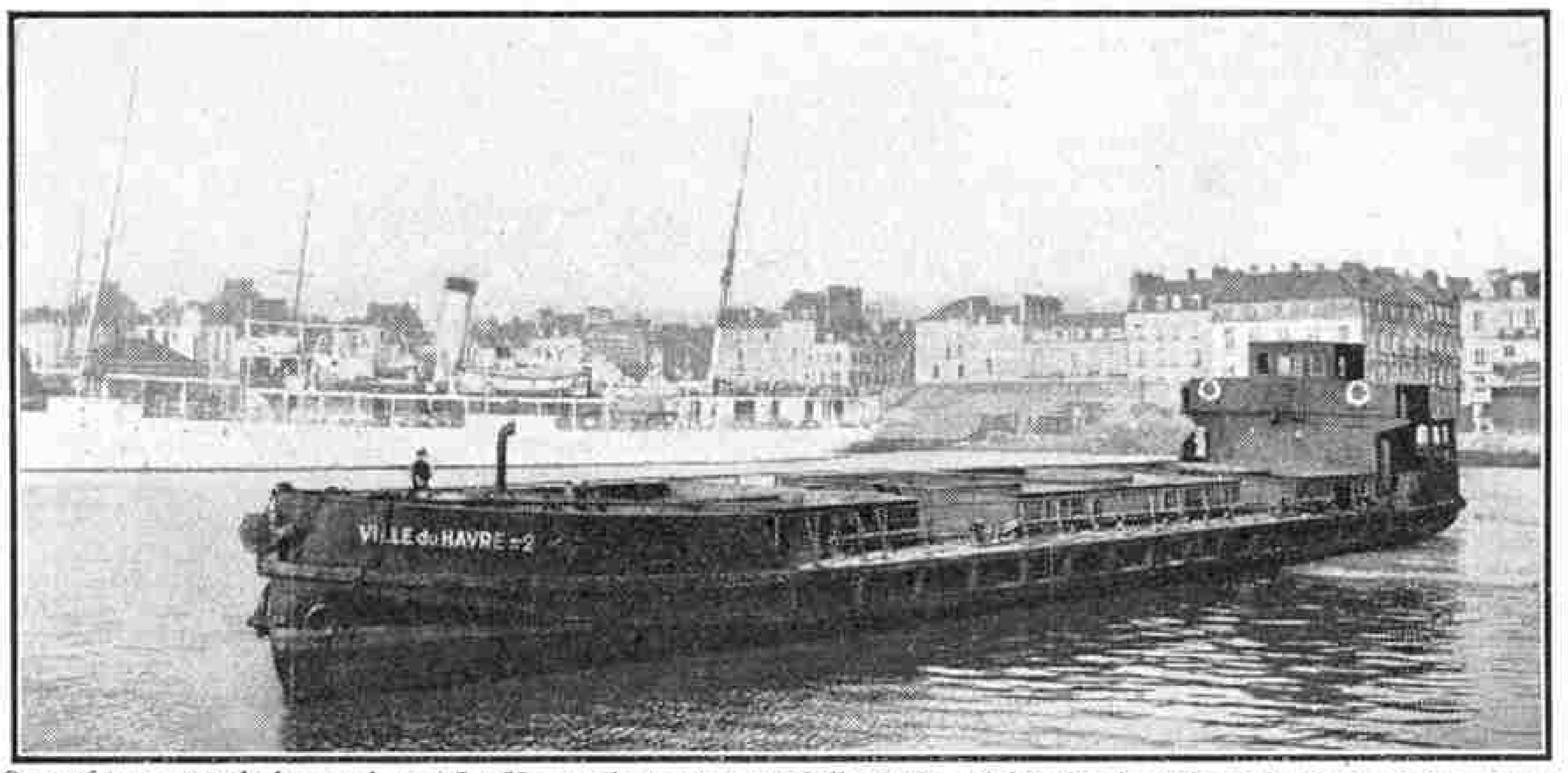
The disposal of refuse in towns is a problem that is difficult to solve. Following collection it can either be burned, which is very costly, or dumped some distance from the town, a method with serious drawbacks. In a few coastal towns it is possible to dump the refuse at sea, and this is the cheapest and most hygienic method.



The "Mauretania" being towed to the fitting out berth after her launch at Birkenhead in July. The installation of the machinery and general completion of the interior is now being carried out. Photograph by B. and A. Feilden, Blundellsands, Liverpool 23.

One of the first cities to adopt the plan of dumping refuse at sea was Le Havre, in France, and the lower illustration on this page shows one of two identical vessels specially built several years ago for this purpose. It is 145 ft. in length, and can carry 15,000 cu. ft. of refuse. A direct-injection 5-cylinder Sulzer Diesel engine is installed, developing 250 h.p. at 375 r.p.m.

The hull is fitted with four containers, and the refuse is discharged from them by a patent device that overcomes the difficulties normally encountered in mechanical discharge work. The two vessels give every satisfaction in operation, and behave well at sea.



One of two vessels in service at Le Havre that were specially designed for the dumping of refuse at sea. Each is driven by a Sulzer Diesel engine. Photograph by courtesy of Sulzer Bros. Ltd., London.

Floating Dock's 7,000 Mile Trip

The Furness Shipbuilding Company recently completed a 4,000-ton floating dock for the South African Railways and Harbours Administration, and after a series of sinking and raising tests had been carried out, the dock commenced its 7,000 miles tow to Durban. It is of the double-sided box type, and has two parallel side walls built on to the pontoon, forming a complete structure. It is capable of lifting vessels of 4,000 tons displacement and 17 ft. 6 in. draught in 80 minutes. Its overall length is 350 ft., with an outside width of 88 ft., and a clear width inside between fenders of 63 ft. 11 in.

The pumps and other machinery are electrically operated, and the equipment includes an electric travelling crane, four electric capstans, and mechanically-operated side shores and bilge blocks.

Building America's Largest Liner

Work on the new Atlantic liner for the United States Lines, under construction by the Newport News Shipbuilding and Dry Dock Co., is well up to schedule. This vessel, at present known as No. 369, will be an improved version of the "*Manhattan*" and "*Washington,*" being slightly larger and having more reserve speed. She will probably have a displacement of 34,000 tons, with a length of 723 ft. Accommodation for about 1,220 passengers and a crew of some 640 will be provided. The launch is scheduled for the 15th July 1939, and it is expected that the liner will be handed over in February 1940.

Already 5,000 tons of steel have been delivered at the shipyard and are being prepared for construction. This represents 30 per cent. of the total required to complete the hull. The laying down of the lines for frames, shell-plates and bulkheads has been completed, and more than a third of the shafting is finished.

The new liner will operate with the "*Manhattan*" and "*Washington*" in the United States Lines weekly service between New York, Channel ports and Hamburg.

Speed Thrills on Water

In August Sir Malcolm Campbell made several attempts to raise the world's water speed record of 129.5 m.p.h. that he established on Lake Maggiore, Italy, in September 1937. Looking for more suitable conditions, this year he took his high-speed hydroplane "*Bluebird*" to Lake Leman, at Geneva in Switzerland. Thunderstorms and torrential rain marred the early trials, but Sir Malcolm declared himself satisfied with the performance of the boat, and expected to improve on last year's efforts. Strong cross currents rendered the handling of the boat very difficult, however, and time after time Sir Malcolm had to throttle down to regain control and correct skids.

On later runs speeds of over 125 m.p.h. were attained, but a burst intake pipe held up attempts when everything seemed set for a record-breaking run. On another occasion a new manganese bronze propeller was tried out, but this bent under the terrific strain and pressure to which it was subjected.

Eventually Sir Malcolm abandoned attempts on Lake Geneva. At one time he considered going to Lake Baldegg, about 10 miles from Lucerne, but decided that it was not really suitable for his purpose. Eventually in September he decided to continue his attempts on Lake Hallwil, in the Canton of Argovie. This lake is about 5½ miles long and 1 mile wide. There he raised the record to 130.91 m.p.h., his speed on the two runs being 131.86 m.p.h. and 129.96 m.p.h. respectively. Thus he improved on his previous figure by 1.41 m.p.h.

Another attempt on the record may be made on Lake Windermere by Mr. E. Spurr, an engineer, in his boat "*Empire Day.*" He is first making an attack on the 1½-litre class record. If he is successful he will fit the boat with a supercharged Schneider Trophy engine of 1,400 h.p., for an attack on the world's record. Finally he intends to challenge Gar Wood for the Harmsworth Trophy.

The Largest Dredger in the World

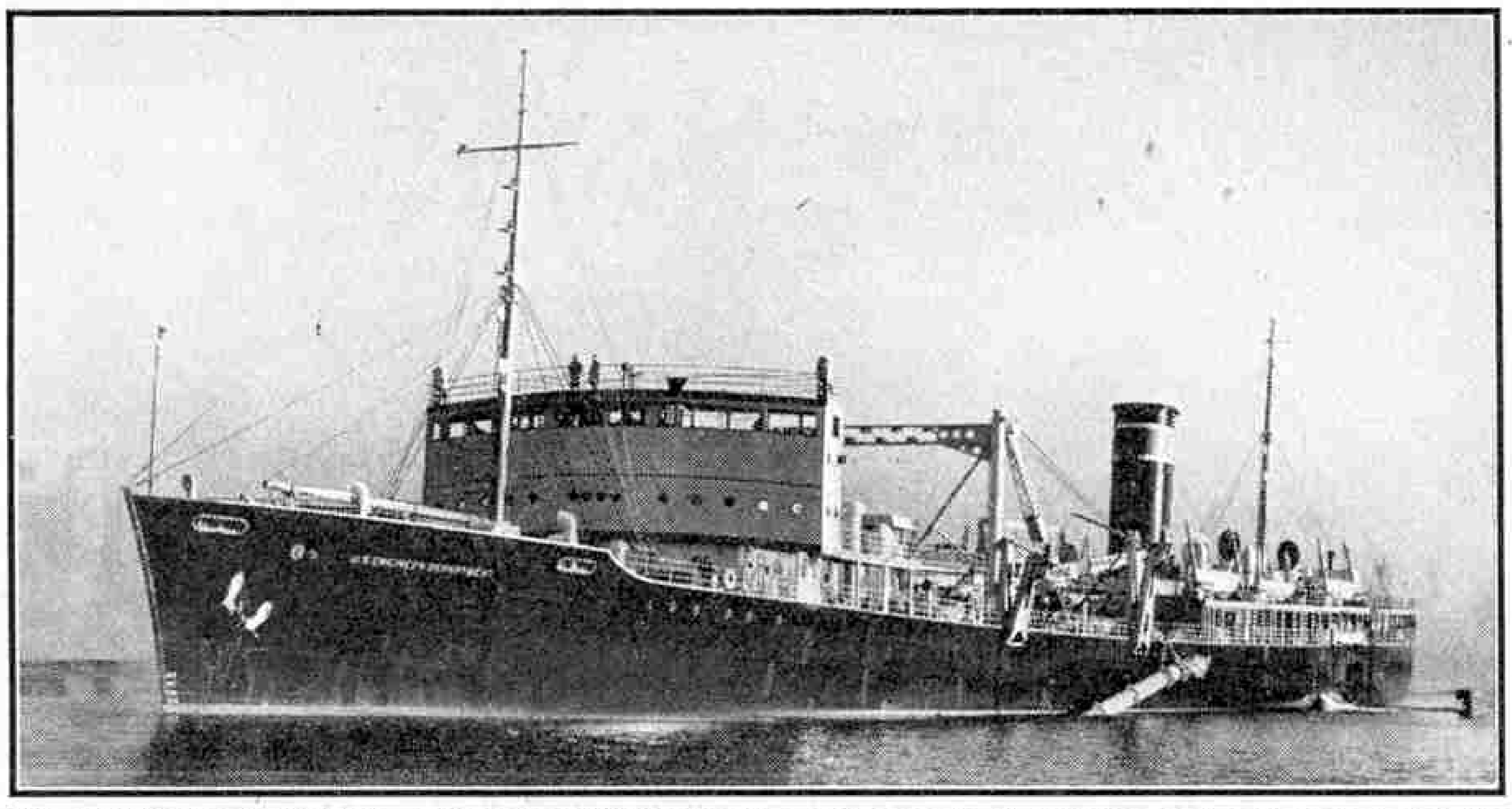
The upper illustration on this page shows the new dredger *"Goethals,"* built by the Bethlehem Shipbuilding Corporation at their Fore River Plant for the United States Army Corps of Engineers, New York.

This vessel, which was referred to in the June *"Shipbuilding News"* pages, is claimed to be the world's largest dredger, and was named after Major General S. W. Goethals, the builder of the Panama Canal. She is of the hopper suction type, and is one of a fleet of 26 seagoing dredgers and other craft engaged in the maintenance of harbours and channels round the coasts of the United States.

The *"Goethals"* has an overall length of 476 ft. and a displacement of 15,000 tons. Turbo-electric propelling machinery gives her a speed of 13½ knots when light and 11 knots when loaded.

The dredging mechanism comprises two suction drag pipes 30 in. in diameter, placed one at each side of the vessel, and raised and lowered by electric hoists. Motors of 13,000 h.p. operate the suction. The hoppers for the dredged material have a total capacity of 5,000 cu. yds.

A crew of 85 normally is carried, and a further 15 can be accommodated.



The world's largest dredger, "Goethals," engaged in the maintenance of harbours and channels round the United States coasts. Photograph by courtesy of the United States Army Corps of Engineers.

The Life-boat Fleet

Seven motor life-boats built by the Royal National Life-boat Institution recently took up service at their respective stations at Peel, Salcombe, Whitby, Selsey, and Barry Dock, and at Arklow and Dun Laoghaire in Ireland.

The Peel boat, named *"Helen Sutton,"* is of the light Liverpool type, intended for launching from the open beach. She is 35 ft. long and weighs only 7 tons.

A Watson cabin type craft was built for Salcombe, but the standard dimensions were modified to fit her for the special conditions of working over the dangerous Salcombe Bay. She is of particularly shallow draft, and with a length of 46 ft., cost about £9,000.

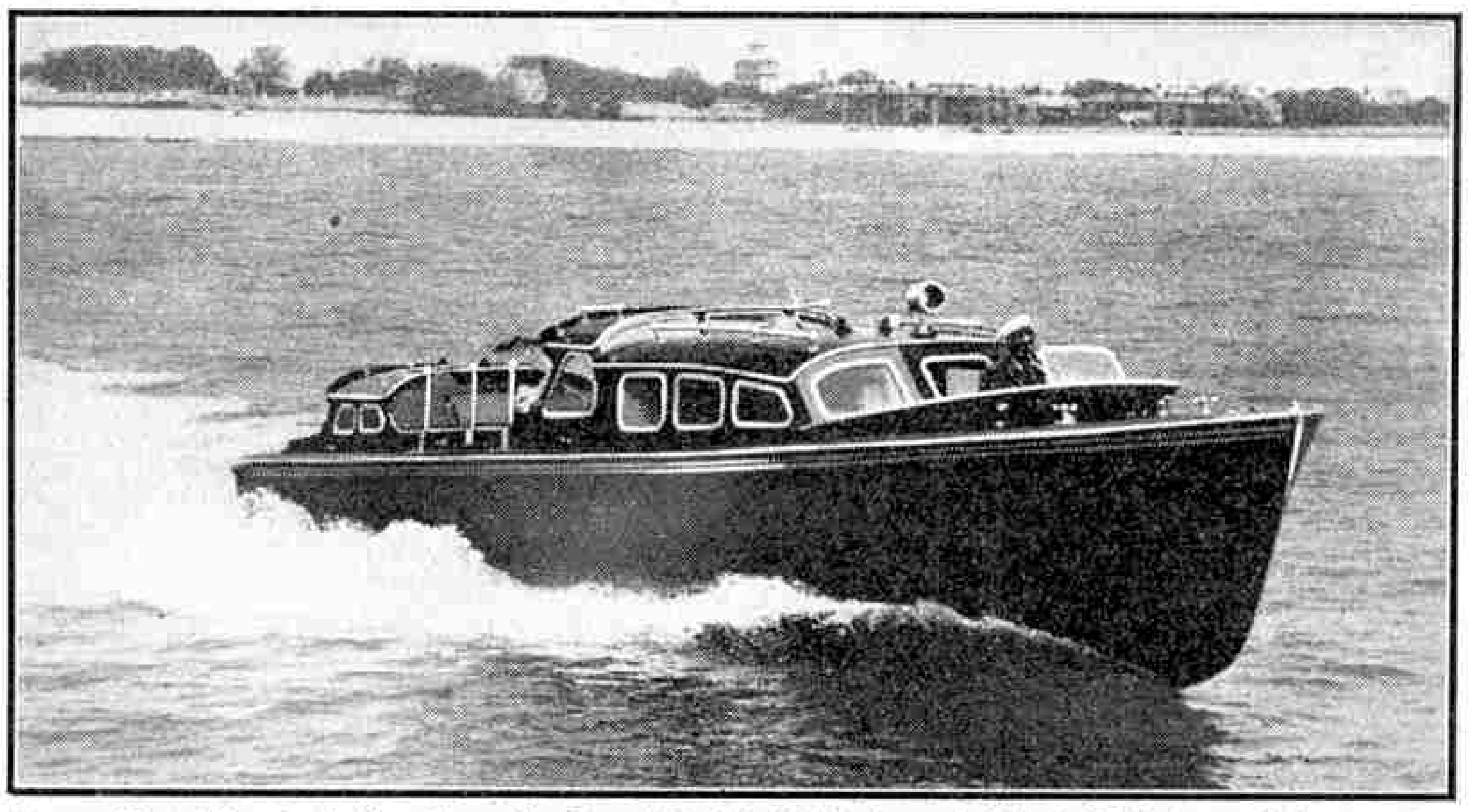
The *"Mary Ann Hepworth,"* stationed at Whitby, is of the Watson type, modified to suit the steep seas on the Whitby Bar. She is 45 ft. in length, and is driven by two 35 h.p. watertight engines at a maximum speed of 8 knots. Whitby had had a life-boat station since 1802, and its craft have rescued over 600 lives.

Watson cabin type boats were built for Dun Laoghaire and Selsey. These craft have a length of 46 ft., with 142 air cases, and each is driven by two 40 h.p. Diesel engines at 8¼ knots.

For the remaining stations at Arklow and Barry Dock, boats of the Watson 41 ft. type were provided. They are fitted with two 35 h.p. petrol engines, and can travel 120 miles at full speed without refueling.

The Institution laid down 11 more motor life-boats in July. These will be completed next year, and stationed at Hartlepool, Dunmore East in County Waterford, Falmouth, Cadgwith and Porthoustock, in Cornwall, Filey, Caister, Ferryside in Carmarthenshire, Rhyl, Aberdeen (No. 2 station), and Montrose (No. 2 station). The boats for Hartlepool, Falmouth and Dunmore East will replace motor life-boats, and the other eight will replace pulling and sailing craft.

The Institution had previously laid down eight motor life-boats this year, and at the beginning of 1938 there were already 16 being built, so that during this year 35 motor craft will be under construction. This is the largest number ever in hand in one year. All the new life-boats will be completed next year, when they will be put into service.



A new Royal Barge stationed on the Royal Yacht "Victoria and Albert." Photograph by courtesy of Vosper and Co. Ltd., Portsmouth, the builders of the vessel.

Large Oil-Electric Vessel

The new twin-screw passenger and cargo ship *"Patria"* built by the Deutsche Werft, of Hamburg, for the Hamburg-Amerika Line, is stated to be the largest oil-electric vessel in the world. She has a gross tonnage of 16,000. The propelling machinery consists of six two-stroke, 3,000 b.h.p. oil engines, each directly coupled to a 2,140 kVA alternator. The propellers are driven by two synchronous motors of 7,500 h.p. The *"Patria"* commenced her maiden voyage to South America on 27th August.

The Institute of Marine Engineers

An examination for admission to Associate Membership of The Institute of Marine Engineers is to be held on 15th–22nd May 1939, and the annual examination for membership of Probation Students and Students will take place on 15th–23rd May.

The Institute's examinations are held in London and provincial centres, according to candidates' places of residence. Full particulars may be obtained from the Secretary, The Institute of Marine Engineers, The Minories, London E.C.3.

In the Atlantic Service

During the first two years of her service on the Atlantic route, completed recently, the *"Queen Mary"* made 86 crossings, covering in all over 256,000 miles. She carried over 115,000 passengers.

The French liner *"Normandie"* recently completed her 100th Atlantic crossing. Since taking up service on 29th May 1935, she has steamed altogether 330,000 nautical miles, and been at sea 554 days. Over 230,000 passengers have been carried. The *"Normandie's"* designed speed was 28.5 knots, and the actual average so far is 28.58 knots.

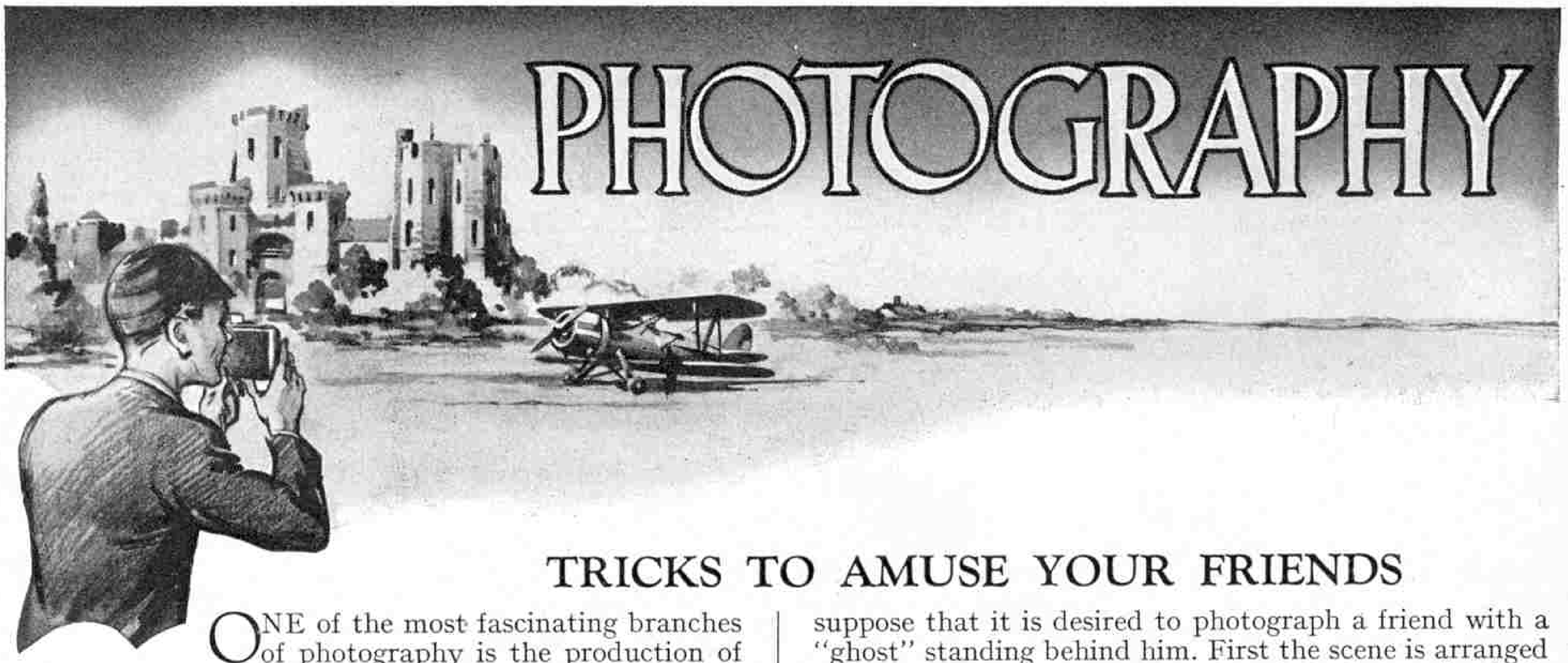
England-Australia Record

The Orient liner *"Orontes,"* of 20,097 tons, recently completed a voyage between England and Australia in the record time of 27 days, reaching home two days ahead of schedule. When the vessel arrived at Colombo from Fremantle she received instructions to accelerate, as her sister ship *"Oronsay"* had developed engine trouble and the *"Orontes"* would probably have to take her place on arrival. Fortunately the vessel has a considerable margin of power in hand.

Royal Barge for *"Victoria and Albert"*

The lower illustration on this page shows the new Royal Barge constructed by Vosper and Co. Ltd., for the Royal Yacht *"Victoria and Albert."* The boat is 40 ft. in length, and has a maximum speed of over 20 knots. Great care was taken in the designing of the hull, which is remarkably seaworthy and rides smoothly at speed. The craft has a very neat appearance, the hull being finished in black, with maroon cabin tops and silver-plated metal fittings. An excellent all-round lookout is given from the navigating "bridge," from which point the pilot has complete control of the boat. Separate control panels for each engine are provided.

Three Vosper V8 engines are installed. These are a marine version of the well-known Ford V8 engine. Double silencers are fitted to each engine, and the engine compartments are sound-proofed.



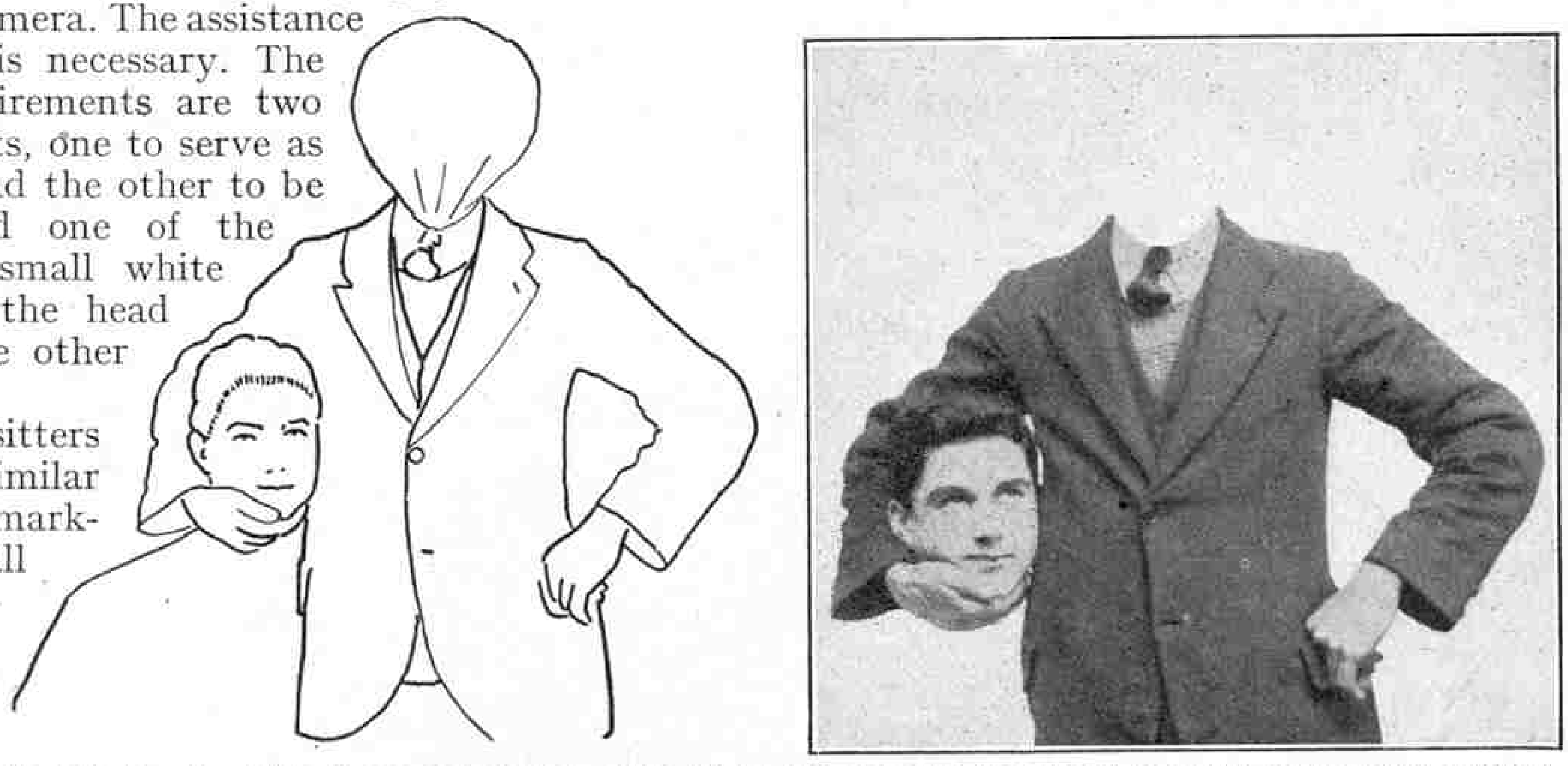
PHOTOGRAPHY

TRICKS TO AMUSE YOUR FRIENDS

ONE of the most fascinating branches of photography is the production of humorous "trick" or "fake" prints. The variety of results it is possible to obtain even with the most simple cameras is almost endless, and as all the work can be carried out indoors, photography of this kind is particularly suitable for the long winter evenings.

Probably the most mysterious photographic trick is the "Headless Man." The illustrations on this and the opposite page reveal the idea and the means by which the illusion is produced, and the photography can be carried out with a box camera. The assistance of two friends is necessary. The only other requirements are two large white sheets, one to serve as a background and the other to be wrapped around one of the sitters, and a small white cloth to cover the head and neck of the other sitter.

The two sitters should be of similar build, since any marked difference will lead to incongruity in the finished result. One must be swathed from the neck downward in a white sheet, while the other, whose head is covered with the smaller white cloth, holds the former's head in his hands.



The "Headless Man." The gruesome photograph on the right can be produced with any kind of camera, and how the mystifying trick is carried out is revealed by the accompanying drawing.

The negative should be slightly over-exposed, and as an image of sharp contrast is wanted development must be prolonged until a considerable degree of density has been built up in the negative. The prolonged development, coupled with over-exposure, will blot out the shadow detail in the "shroud."

Prints showing a man shaving himself or extracting one of his own teeth are other examples of humorous photographs that can be produced on similar lines; while a photograph of a headless man engaged in trimming off with scissors one or two curves in his neck is also within the scope of this model.

Another popular trick photograph is the "ghost" picture. Prints of this kind are very easily made, and even the simplest box camera will give good results. Let us suppose that it is desired to photograph a friend with a "ghost" standing behind him. First the scene is arranged as required, and then the friend and the "ghost," who is covered from head to foot with a white sheet, are placed in their respective positions. A photograph is taken, giving only one-half the full exposure required. The "ghost" then walks out and the second half of the exposure is given, the sitter keeping perfectly still between the two exposures. The negative will then show the sitter and the scene properly exposed, and only a thin transparent image of the ghost will appear in the view.

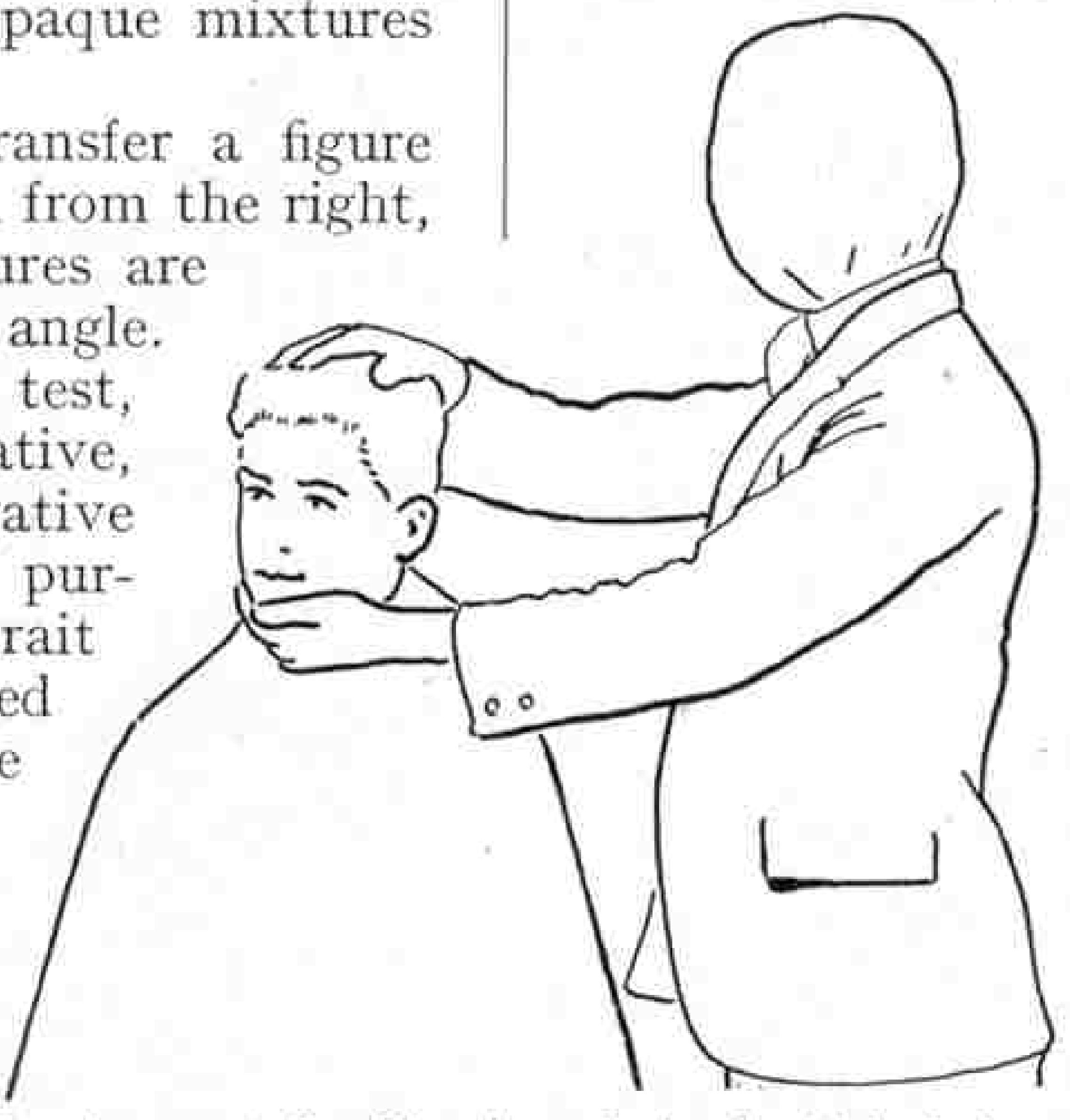
A photograph showing a person "imprisoned" in a bottle is an amusing photographic trick that is easily produced with a camera having a focussing screen. A clear glass bottle is placed against a dark background such as a piece of brown paper, and focussed to a large size upon the ground-glass screen. Next, four pieces of stamp paper are stuck on the screen to mark the inside portion of the bottle. A plate is then exposed to get a picture of the bottle, but is not developed.

Next the person who is to appear in the bottle is placed against a black background, and the figure is focussed so that it comes within the area marked by the stamp paper on the screen. The undeveloped plate is replaced in the camera, and given a second exposure. When the plate is developed in the usual way the figure will appear to be standing inside the bottle. The secret of success is to have the backgrounds dark and the sitter in light clothes.

The "man in a bottle' 'trick and many others may also be done by a process known as "double" or "combination" printing. Combination printing is most frequently used to put in a more suitable background to a portrait or to place figures in landscapes, and readers will find this process a great help in the production of "mystery" photographs. For example, suppose that it is desired to transplant a photograph of a friend, taken against an unsightly brick wall, into the foreground of a beautiful landscape photographed on another occasion. All that is required is some daylight printing paper and red water-colour paint, or some of the special opaque mixtures sold for blocking out negatives.

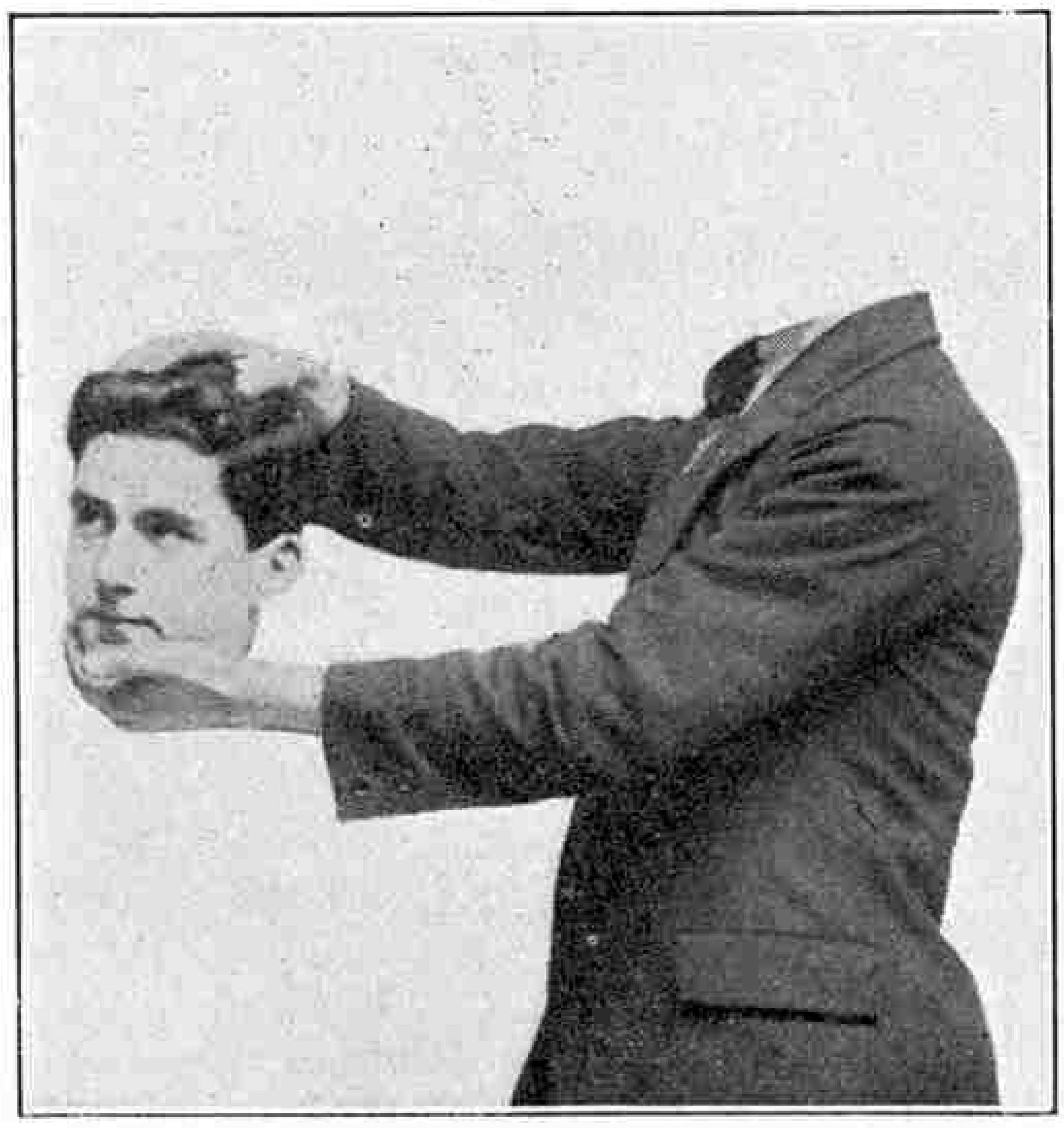
Obviously it would be absurd to transfer a figure lighted from the left into a view lighted from the right, so care must be taken that both pictures are lighted from approximately the same angle.

Assuming that the negatives pass this test, work is commenced on the portrait negative, which we will call "A," the landscape negative being labelled "B," for identification purposes. First, everything except the portrait on "A" is painted out, a very fine-pointed brush being used to preserve the outline of the figure. Sufficient colour must be laid on to render the blocked-out portion equally dense in every part. As soon as the paint is dry an ordinary P.O.P. contact print is made. This will show the figure against a plain white background. The next step is to paint over the figure on the print, so that it is completely protected from light action while the remainder of the print is being made. As P.O.P. is sensitive to daylight, it is advisable to carry out this operation in artificial light, care being exercised to ensure accuracy in exactly covering the outline, overlapping either way being avoided.



How to arrange the sitters in producing the trick photograph reproduced below.

The paper bearing the painted-over figure is now placed in contact with negative "B," and a print is made of the same depth of tone as the figure. The print now shows a landscape with a paint-covered figure, and a little rinsing under the tap will quickly remove the paint. The print is now toned and fixed and there should be nothing to indicate that it is other than an untouched print from one negative. Your friend will be greatly mystified to find himself photographed in a place where perhaps he has never been!



Another "Headless Man" picture easily produced by the method shown in the illustration at the top of this page.

Another highly amusing photographic trick is the production of a print showing a person or object severely distorted. The most simple method of working, and one that does not necessitate the making of a negative specially for the purpose, is as follows. A suitable negative, preferably a full length portrait, is selected and then soaked in water until the gelatine emulsion is softened. It is then left to dry until all water drops on the surface and back of the negative have evaporated. Then while the emulsion is still soft, the negative is held over a moderately warm flame such as that from a small gas jet turned almost "off." The gelatine will soon begin to melt, and the negative should then be tipped and twisted about so as to divert the flow in the desired direction. For instance, the gelatine on which is the image of the person's legs may be run sideways slightly, while his head may be separated from the body by a lengthy neck! When the desired effect has been obtained the negative should be laid in a horizontal position and left to cool. If a film negative is used, care must be taken to prevent it from becoming ignited, and in this case it is best to melt the gelatine by the heat from an electric light bulb.

A photograph of a person with a gigantic head and a little body is another amusing trick that never fails to command a laugh. Many variations of this trick will, of course, suggest themselves, and the method of working is practically the same in every instance. The most simple method is known as the "paste-on" process. No special equipment is necessary and suitable existing prints can be used. Two photographs of the same person are required. One of these should be a "close-up" showing the person's head on as large a scale as possible. The other must be a full length portrait, and should be taken at some distance so that it is on quite a small scale. The best results will be obtained with photographs that are lighted from the same angle, and if special photographs are taken for the purpose this point should be carefully watched.

The large head from the close-up print is carefully cut out and pasted in position on the small body of the other print. The joined-up prints should be as nearly as possible similar in tone, and the picture to be pasted on should be made on thin paper, so that the edges of the cut-out will not be visible. The effect is greatly improved by a little careful pencil shading on the combination print to hide any signs of the joint.

If a camera with double extension is available to permit copying, the combined print should be photographed. Prints from the resulting negative will be found even more effective than the original combination print.

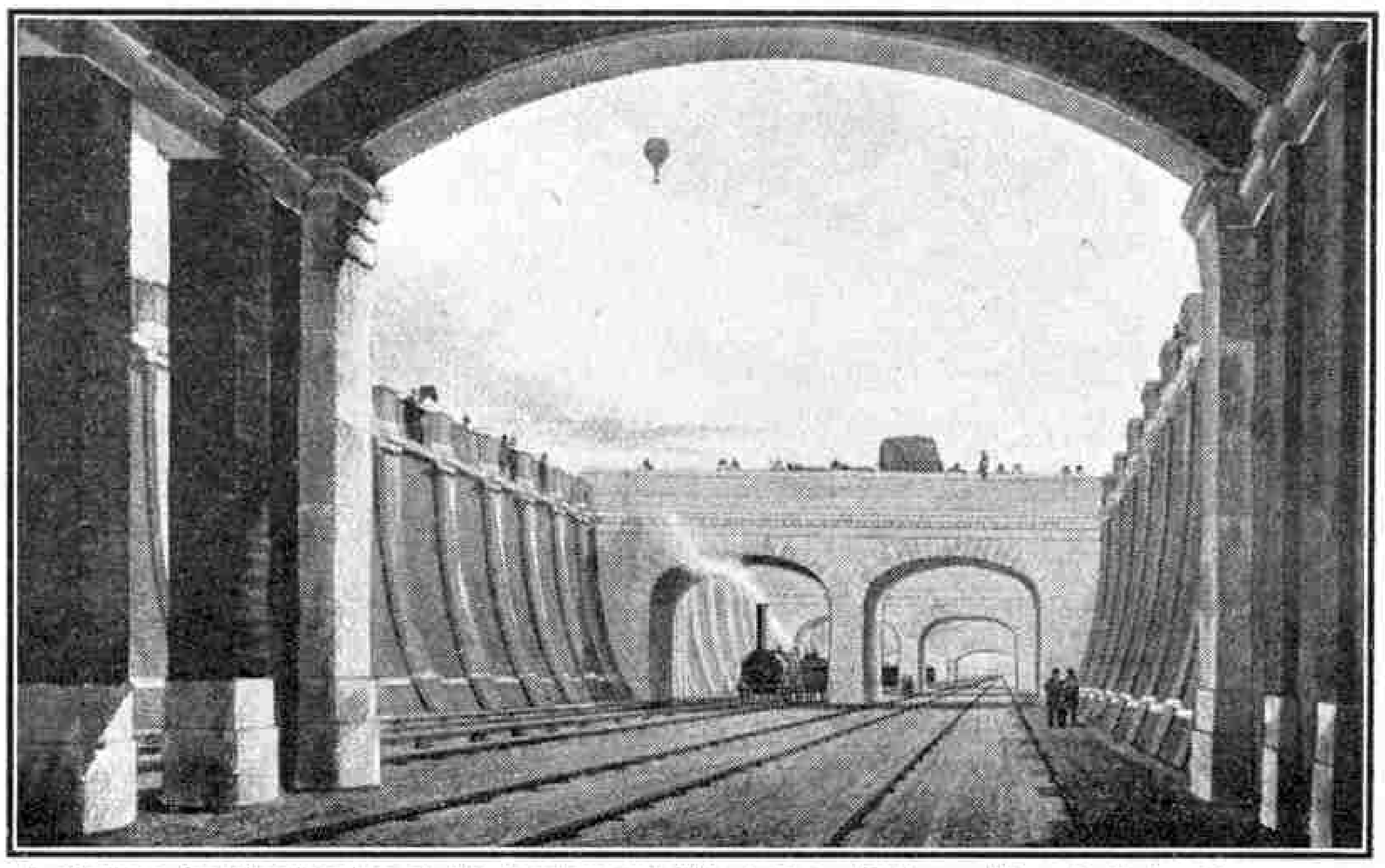
To render the description simple we have confined ourselves to a very straightforward example of a combination print, but endless scope is provided by this method for the production of different types of humorous subjects. Other examples are "Grandpa vaulting a pillar-box," a boy riding a bicycle on the sea, or even a Rugby footballer making a gallant leap six yards into the air to prevent a "drop" at goal from crossing the bar. A slightly different procedure is required in the case of "Vaulting Grandpa." A print of this kind would require three exposures and three printings—first a portrait of Grandpa; second, a chum vaulting a small table or other fairly wide object; and third, a street scene including a pillar-box. Grandpa's head would have to be superimposed upon the vaulter's shoulders, and the latter pasted in turn over the pillar-box. Other good trick photographs can be produced by combining two or more of the foregoing suggestions.

It should be remembered that success in trick photography is attained not so much by the use of special apparatus as by imagination and careful planning. The subject is full of fascination and provides a good training in the working of various photographic processes.

London and Birmingham Railway Centenary

Notable Display at Euston

THE L.M.S. have just celebrated an important centenary, for 17th September was the hundredth anniversary of the opening throughout of the London and Birmingham Railway. The event was marked by a notable display at Euston of locomotives and rolling stock showing the progress made in rail transport during the past century. Other exhibits included early documents, prints, models and so on, associated with the event.

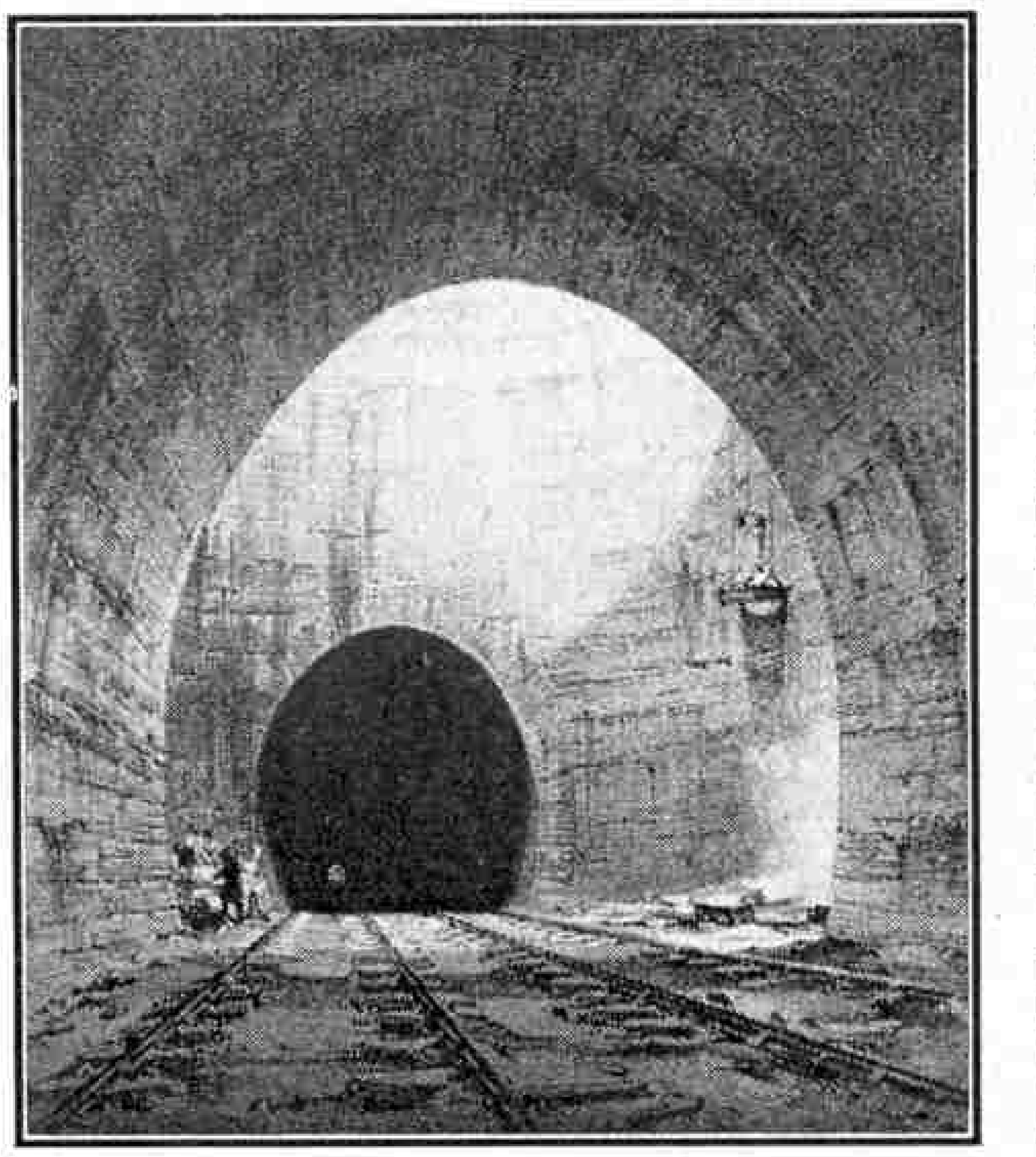


A view on Camden Incline on the London and Birmingham Railway. The winding cable ran over pulleys on the track. The photographs to this article are by courtesy of the L.M.S.

The London and Birmingham Railway was important as being the first main trunk line to be opened from London; and at the time, 100 years ago, it was the longest railway system in existence, the distance from Euston to Birmingham being 112¼ miles. The Bill promoting the line was passed by the House of Commons in 1832, but it was thrown out by the Lords, for the great landowners were strongly opposed to the line. The railway was described as "an unnecessary road," and it was said that it would "in a very few years destroy the nobility." The Bill was re-introduced in 1833, and this time there was little opposition. The landowners had found how they would benefit by asking tremendous prices in return for the strips of their property that were required for the railway.

At first the London terminus was to be at Camden Town, but in 1835 a supplementary Act was passed that authorised the extension to Euston Square, as the station was first called. The line was opened for traffic from Euston to Boxmoor on 20th July 1837, and to Tring in the following October. In 1838 the month of June saw trains in operation between Euston and Denbigh Hall, near Bletchley, and between Rugby and Birmingham. Road coaches were used to assist in providing the through service, an interesting instance of rail-road co-ordination. This fact is commemorated on the stonework of the bridge over Watling Street right by the Denbigh Hall Inn, from which the temporary station at this spot took its name. Finally in September 1838 the railway was completed and opened throughout for traffic.

The making of the line was a big engineering task for those days for all the works were on a large scale. Robert Stephenson was entrusted with the construction, which cost £5,698,375, or £50,652 a mile. The principal engineering feature was the Kilsby Tunnel between Welton and Rugby, nearly 1½ miles long. The contractor struck hidden springs that flooded the tunnel, and on one occasion when the water broke in the men were only saved by being towed on a raft by one of their engineers who swam with the hauling rope between his teeth! Further trouble was experienced with a quicksand that the trial shafts sunk had not located.



An early scene in Kilsby Tunnel below one of the two ventilating shafts each 60 ft. in diameter.

In spite of expert advice to abandon the tunnel, the company relieved the contractor of his contract and determined to see the work through themselves. Under Stephenson's supervision work proceeded night and day, and ultimately the tunnel was finished. Instead of the estimated £99,000 it cost £300,000 to complete, 36 million bricks being used, while 1,250 men, 200 horses, and 13 steam pumping-engines were employed. Prominent features of the tunnel are its two huge ventilating-shafts. One of these is 120 ft. deep and the other has a depth of 90 ft. each having a diameter of 60 ft.

Among other important engineering works on the London and Birmingham Railway was the great cutting at Tring, 2½ miles long and 60 ft. deep. In its construction 400 men were employed for 3½ years, excavating 1,750,000 tons of spoil. In those days there were no mechanical excavating appliances, and the whole of the material removed was wheeled in barrows up a system of planks laid at intervals up the sides of the cutting. At the top of the slopes a pulley was mounted above each plank gangway, and a rope passing over this had its upper end connected to a horse, its lower end being fastened to the waist belt of each navvy. Thus when the horse was driven away from the top of the cutting the navvies and their barrows were assisted up the slope.

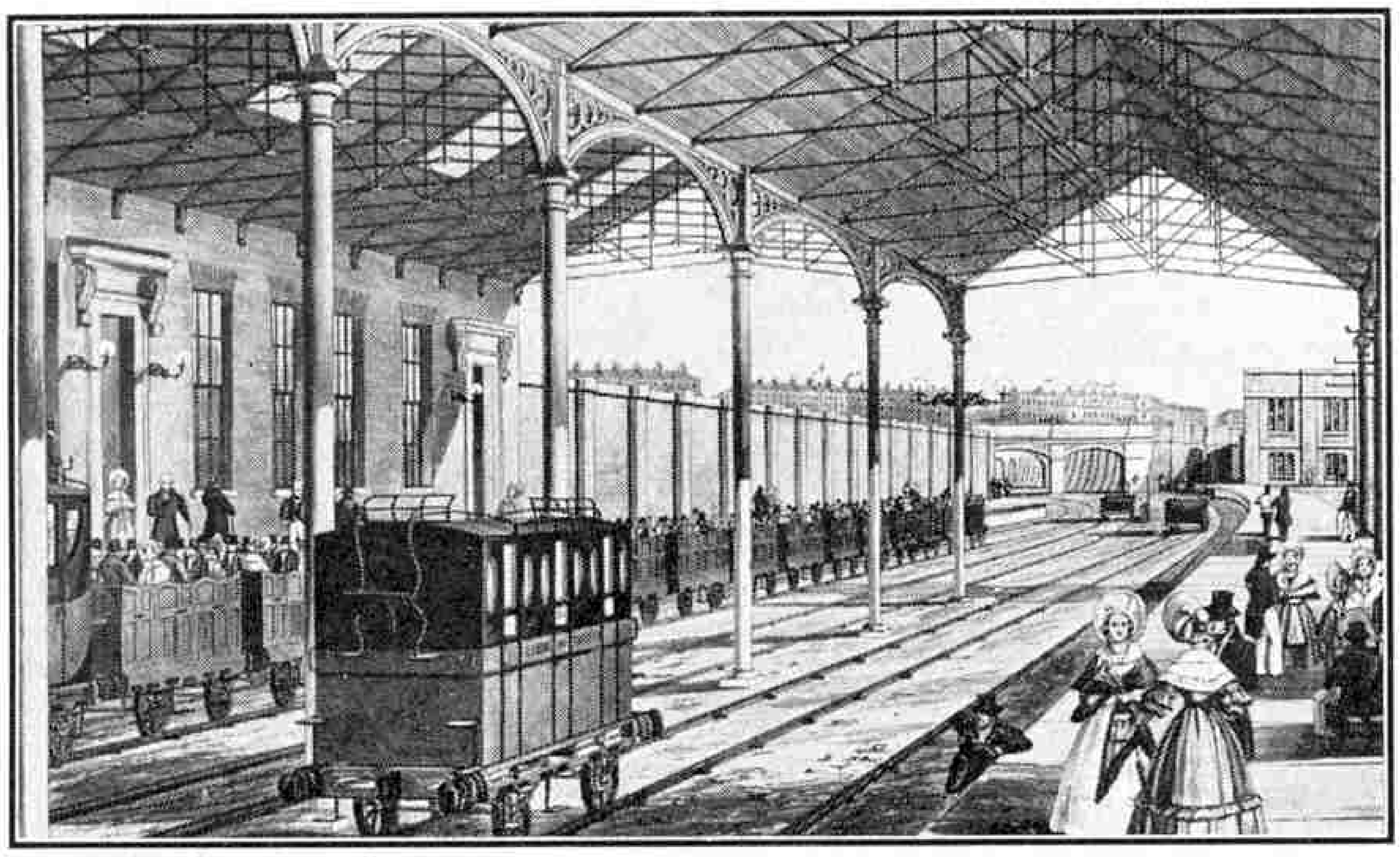
After the spoil had been tipped the horses were led back again to the top of the cutting, thus letting down the men with their barrows to the bottom of the slope. The men made a practice of running their barrows down the steep slopes, the success of this hazardous operation depending on the horse maintaining an even pace. If his barrow got out of control a man would try to throw it off the plank on one side while he ran down the other. Most of the labourers were thrown down the slopes of the cutting several times during its construction, but they developed an extraordinary degree of skill in these descents. The engineer in charge of this section devised a moving platform arrangement in order to eliminate the practice of running, but the navvies, fearing for their jobs, broke it up!

The cutting at Roade was a more costly affair. It had to be driven through hard blue limestone, and the excavation of 1,200,000 cu. yds. of material was involved. Under the limestone rock was clay, and beneath that again large beds of loose shale that made the use of pumps necessary. Gunpowder was used for blasting, and 300,000 lb. of it were required; and 800 stonemasons, miners, labourers and boys were employed in excavating the cutting and in building the retaining walls that were found necessary.

In 1838 Euston Station consisted of only two platforms with a total length of less than 300 yards. Of these the "Departure Parade," as it was called, still exists as the present-day Platform 6. The total extent of the station then was about seven acres. To-day Euston covers 18½ acres, with 15 platforms totalling more than two miles in length; and it deals with 350 trains and 80,000 people a day. When the London and Birmingham Railway was opened trains were hauled up the mile-long incline from Euston to Camden Town on an endless rope 4,080 yds. long, operated by winding engines, as locomotives were considered insufficiently powerful.

Euston was distinguished by its Doric Arch that cost £35,000, well known to successive generations of travellers, and still existing although its future, in view of impending alterations, is uncertain. The original terminus at Birmingham was at Curzon Street; it was fronted by a massive portico of Ionic columns, which cost £26,000. This station has not been used for passenger traffic since the opening of New Street Station in 1852, but many interesting relics of the early days still remain. Curzon Street is now an important L.M.S. goods depot.

Wolverton was the half-way stage on the line, and became one of the first of Britain's "railway towns" for the construction and repair of engines and rolling stock. The locomotive work was later transferred to Crewe, but Wolverton to-day is one of the principal L.M.S. factories for the construction and repair of rolling stock.



Inside Euston Station in 1838. The present-day No. 6 Platform occupies the same position as the platform on the left behind the train. This was originally known as the "Departure Parade."

The London and Birmingham Railway worked closely in connection with the Grand Junction, which for a time was the most important railway in the country. In 1846 these two companies, and the Manchester and Birmingham, which had only got as far as Crewe, were amalgamated as the London North Western Railway. Until grouping in 1923, when it lost its identity in the L.M.S., this was one of the most autocratic of our railways and claimed unchallenged the title of the "Premier Line." It handed on to the L.M.S. a very real prestige, which has been further developed under the L.M.S. regime.

Locomotive power on the London and Birmingham Railway was supplied by contract, a curious arrangement. Edward Bury, noted for his policy of favouring four-wheeled locomotives only, was the contractor, and owing to his conservative policy London and Birmingham engines remained small. On the formation of the L.N.W.R. Bury retired, but not before he had been compelled to adopt the six-wheeled type of engine. By this time the construction of engines at Wolverton Works had been commenced, and under J. E. McConnell locomotive power reached a high standard.

In 1841 it was possible to spend six hours on a through journey between London and Birmingham. The fastest train took $4\frac{3}{4}$ hours, and the remainder between 5 and $5\frac{3}{4}$ hours. In those early days only first-class passengers enjoyed enclosed accommodation, and the guard of the train rode aloft, like his counterpart on the road mail coach. Trains were signalled by means of white and red flags, or lamps by night, that were wielded by men known as "policemen." These were dressed in a livery including swallow-tail coats and top hats, and resembled closely the police of the period.

Part of Euston to-day. It is interesting to compare this photograph with the upper illustration on this page, covering approximately the same area in the station.

Gradually improvements were made in train services and in speed, and by 1876 there was one train, the 4 p.m. down, taking $2\frac{3}{4}$ hours for the run. The "Two-Hour" standard for the Birmingham trains was developed as the result of an experimental booking instituted in August 1902, when the 5 p.m. train from Birmingham was required to reach Euston at 7 p.m. In 1905 the two-hour timing was extended to a whole series of trains; by 1914 the number of two-hour trains had been increased to six down and seven up, but War conditions led to the establishment of a minimum time of $2\frac{1}{2}$ hours.

The two-hour service was restored in 1921, and a stop at Coventry became the rule within the limit of the two-hour timing. The next notable development came in 1932, when the 4.50 p.m. up train commenced to make a two-hour journey with two stops, at Coventry and Willesden respectively. The start-to-stop run between these two places had to be covered at 61.8 m.p.h. This was the first mile-a-minute schedule on the L.M.S. The overall time for the fastest trains is now 115 min., including one stop. There are four down trains on this timing and three up trains. The most recent development has been the bestowal of the name *"Centenary"* to the service provided by the 9.15 from Euston to Birmingham and the 4.50 p.m. in the opposite direction.

The Exhibition arranged during the Centenary period at Euston last month formed a striking pageant of railway progress. Suitably enough this was arranged at Platforms 6 and 7, covering the area surviving from the original station. Outside the Exhibition at Platform 5 was a replica of Stephenson's *"Rocket,"* from which all L.M.S. locomotives to-day can trace their direct descent. In the Exhibition itself was the 0–4–2 tender locomotive *"Lion,"* originally a Liverpool and Manchester engine, which ultimately passed into the hands of the L.N.W.R. A typical Bury four-wheeled locomotive was shown in the 0–4–0 *"Coppernob"* actually belonging to the former Furness Railway. Although these two had no direct connection with London and Birmingham affairs they formed an interesting specimen of early locomotive construction.

Next was an old favourite, the L.N.W.R. single-driver *"Cornwall,"* originally a freak locomotive with its boiler slung below the driving axle of its giant 8 ft. 6 in. driving wheels. The famous "George the Fifth" class, so long associated with Birmingham trains, was represented by *"Coronation,"* built at Crewe in 1911, and specially named in honour of the Coronation of King George V and Queen Mary. The final locomotive exhibited was one of the latest L.M.S. 4–6–2 streamlined locomotives representative of the most up-to-date practice, and of an external form undreamed of when the plucky little Bury engines clattered their way along the line.

The rolling stock exhibits included replicas of Liverpool and Manchester Railway stock; there was also the ornate saloon carriage constructed by the London and Birmingham Railway in 1842 for Queen Adelaide, which has been preserved at Wolverton for many years. It is a remarkable example of the old coach-builders' art. This and Queen Victoria's saloon compared strangely with the two coaches and kitchen car of *"The Coronation Scot"* and a modern first-class sleeping car. Ordinary corridor coaches completed this representative display, which afforded many striking contrasts.

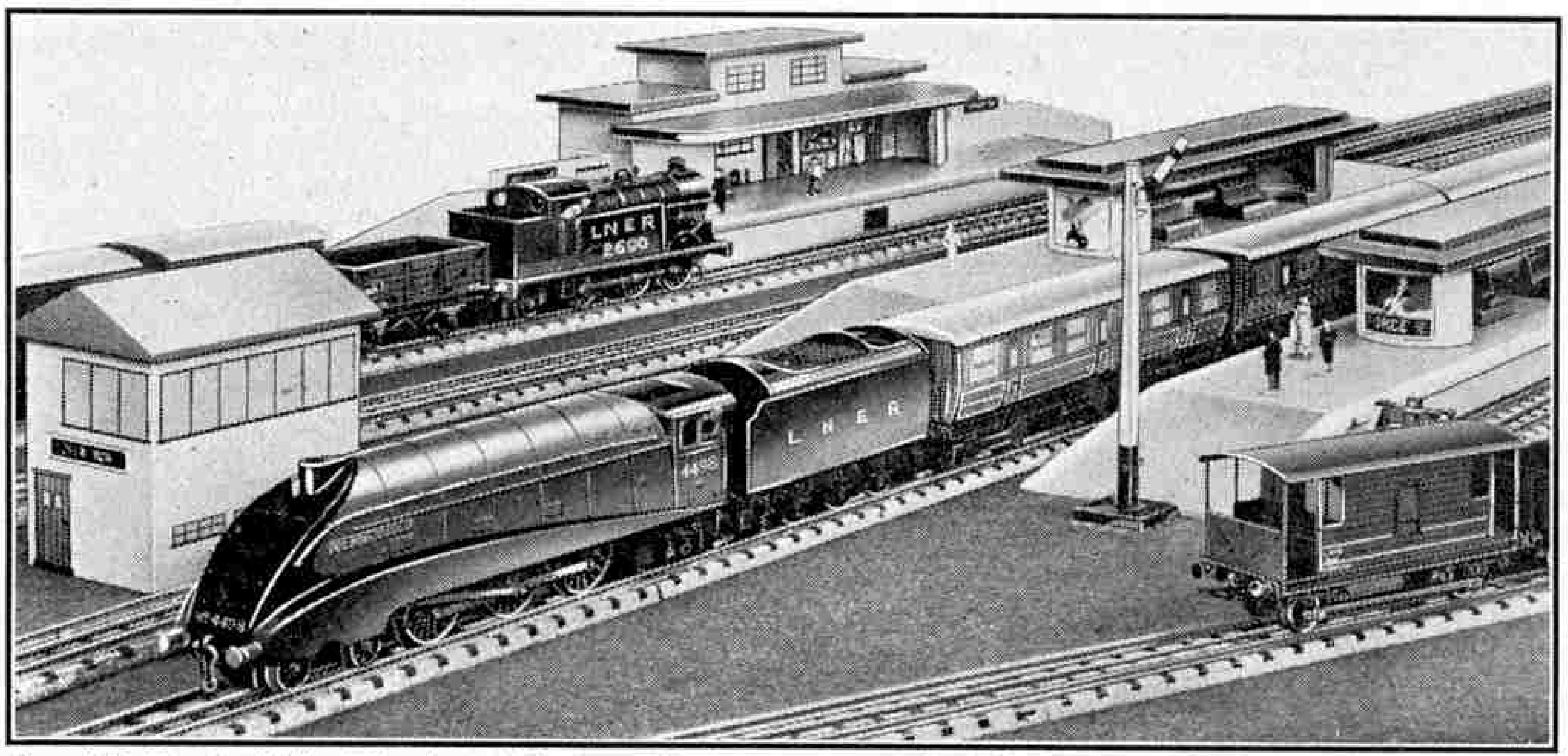
An interesting detail of the Exhibition was the realistic representation of the entrance to Kilsby Tunnel, through which the public passed from the outdoor section into the passage leading to the indoor section. This included such relics as the original contract between Robert Stephenson and the directors of the London and Birmingham Railway, the first prospectus, early fare-sheets, and copies of the rules and regulations. There is also to be seen a series of models showing the development of the locomotive in the past 100 years, together with specimens of early permanent way of iron. Another interesting model 20 ft. long, the largest in this section, shows the Euston Station of 1838, with a train, passengers and horse cabs, and a model of a modern Birmingham express running round it. The famous Doric Arch already referred to in this article is shown in this model as its designer meant it to be seen, without any structures near to obscure it from view.

Hornby-Dublo Trains

The Perfect Gauge OO Table Railway Arrives!

THE announcement in last month's *"M.M."* of the introduction of the new Hornby-Dublo Railway System has created widespread interest among model railway enthusiasts, and we have received requests from all quarters for details of the trains. In this article we describe the main features of this Gauge OO System, and show something of its marvellous possibilities.

Many readers have asked what is the real meaning of Gauge OO. The word "Gauge," used in reference to railways, means the width of the track measured from inside to inside of the heads of the running rails. In Gauge OO this width is 16.5 mm., or approximately ⅝ in.; in other words, it is roughly half the width of the familiar Hornby Gauge O track. This small scale makes it possible to accommodate realistic layouts in surprisingly little space. For instance, the interesting layout shown in the upper illustration on the opposite page can be accommodated easily on a dining table, for it occupies a space of only 6 ft. by 3 ft. 6 in. It consists of an oval main line with two stations and there are two sidings. One is inside the main oval and the other, which is outside it, serves the goods depot. The Hornby-Dublo System is in fact the perfect table railway.



A realistic Hornby-Dublo station layout. The streamlined express locomotive "Sir Nigel Gresley" is at the head of an express train, while a 0-6-2 tank engine is hauling a train of wagons in the opposite direction.

The scale adopted for the locomotives and rolling stock is 4 mm. to the foot, so that they are roughly 1/76th of the size of real trains. Locomotives, coaches, wagons and accessories are all designed and built in perfect proportion. How realistic they are may be judged from the accompanying photographs; but to appreciate their wonderful fascination they must be seen in motion actually along the rails.

Hornby-Dublo Locomotives are available with either electric or clockwork motors. We will deal first with the former.

The great feature of the modern electric model railway is remote control—that is the operation of the trains from the lineside without any handling of the locomotives. The remote control of the Hornby-Dublo Electric Locomotives is the most perfect ever devised. Starting, stopping, reversing and regulation of speed are all carried out by the movement of one lever. The control is positive. Move the lever to "Forward" and the train goes forward; move it to "Backward" and the train goes backward—every time! There is never the slightest uncertainty. No matter in what direction the train was running previously, it moves instantly in accordance with the movement of the control lever.

Hornby-Dublo Electric Locomotives operate on direct current at 12 volts; they can be operated from alternating current mains supplies through a Dublo Transformer connected to a Dublo Controller. The Controller is a marvel of simplicity, combined with absolute reliability. When the lever is at "off," current is cut off from the track. Move the lever to "Forward" or "Backward," and the train instantly moves in the corresponding direction, and travels more and more swiftly until the lever reaches the stop point marked "Full Speed." If then it is desired to change the direction of the train from forward to backward or vice versa, the lever is moved gradually back to the "Off" position, and then on in the required direction.

Controlling a Hornby-Dublo Electric Train in this manner is the most fascinating experience imaginable. The way in which the train follows the movements of the lever is absolutely thrilling and must be experienced to be realised.

The Dublo Transformer No. 1 is designed to operate one train only, through a Dublo Controller No. 1. Where it is desired to run two trains at the same time on two separate tracks, the Dublo Transformer No. 2 must be used, with two No. 1 Dublo Controllers.

Where the mains electric supply is direct current, or where there is no mains current at all, Hornby-Dublo Electric Trains can be run with perfect success from a 12-volt accumulator with a Dublo Controller No. 1A. The remote control thus obtained is just as efficient as that with a Transformer.

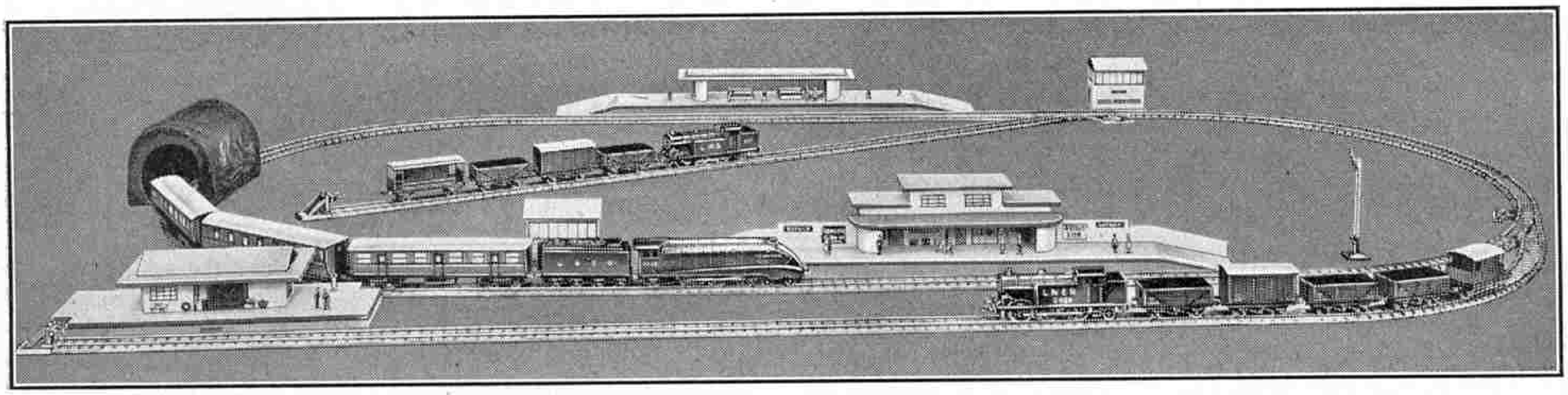
The Motors fitted to the Hornby-Dublo Clockwork Locomotives are of a power and reliability never before achieved in this gauge. These Locomotives are quite extraordinary in pulling power and length of run, and they can be braked and reversed by means of levers in the cab.

Coming now to the trains, there is first of all a Passenger Set hauled by a magnificent model of the famous streamlined six-coupled locomotive No. 4498 *"Sir Nigel Gresley."* This is the most perfect locomotive that has ever been produced in Gauge OO. It is outstanding alike in perfection of detail and quality of finish. The real No. 4498 was the hundredth Gresley "Pacific" to be placed in service on the L.N.E.R., and has the unusual distinction of bearing its designer's name during his term of office. The locomotive that holds the world's speed record for steam, No. 4468 *"Mallard,"* also is one of this class. The tender is of the latest characteristic eight-wheeled type.

"Sir Nigel Gresley" has a pressure die-cast body that accurately reproduces the characteristic contours of the original. The wedge-shaped front and sweeping lines of the casing that covers the cylinders and most of the motion, together with the generally sleek character of the streamlining, have been copied minutely. In addition to capturing the general lines of the engine so successfully, the fact that the body is a pressure die-casting has made it possible to include a great amount of the detail that appeals so much to the model railway owner.

The eight-wheeled tender is fully representative of the well-known corridor tenders first introduced on the L.N.E.R. in conjunction with the non-stop running of *"The Flying Scotsman"* between King's Cross and Edinburgh. The wheel frames are pressure die-cast, with the result that the axle-boxes, springs and other details are splendidly reproduced. The body of the tender generally is of tinplate, and its upper portion, which follows exactly the latest arrangements of the real tenders, contains a load of the most realistic-looking "coal." Both engine and tender are finished in the pleasing shade of blue that has been adopted as standard for L.N.E.R. streamlined locomotives. The wheels are finished in the special L.N.E.R. shade of red, and the model is completed with transfers prepared directly from L.N.E.R. data.

The rolling stock included in the Passenger Train Set consists of a two-coach articulated unit of the type that is used so extensively in making up the standard L.N.E.R. main line trains. The bodywork of these vehicles is finished to represent the familiar varnished teak stock of the L.N.E.R. The two vehicles composing the unit are of corridor type, and an effective corridor connection is provided between them. One of the coaches has passenger accommodation only, and the other is a Brake Composite.

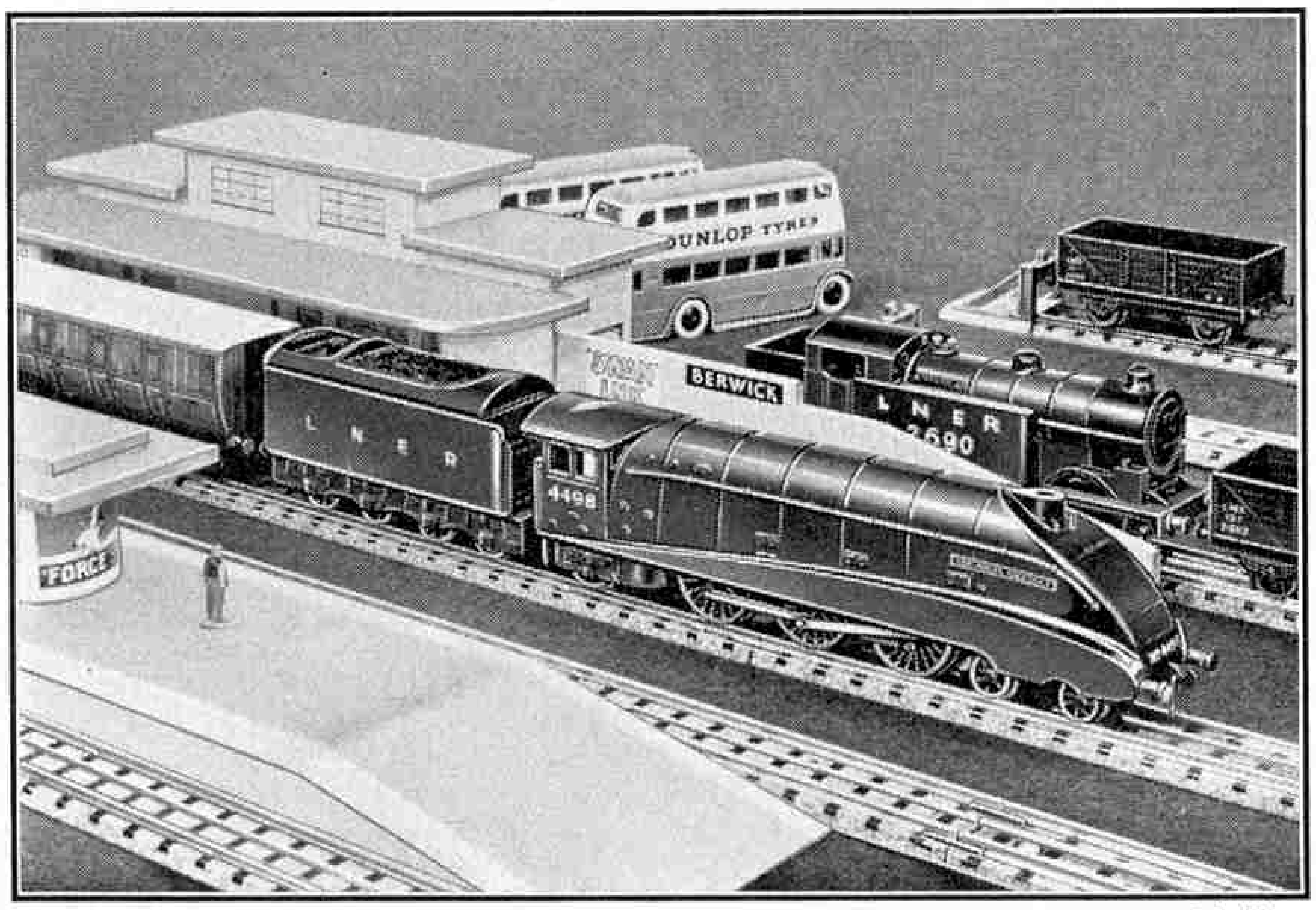


A complete Hornby-Dublo railway in a space of 6 ft. by 3 ft. 6 in., incorporating an oval main line track with two stations for passenger traffic. Sidings are provided and that outside the main track serves the Goods Depot prominent in the foreground.

In addition to the articulated unit contained in the Sets, there is a separate first-third Corridor Coach. It is similar in design and construction to the members of the articulated unit, and it forms a useful addition to the items contained in the Set for making up express passenger trains. In actual practice on the L.N.E.R. a first-third corridor coach combined with a twin unit of the kind represented by these models form the basis of the composition of many of the important main line trains.

A train made up of these vehicles headed by the miniature "*Sir Nigel Gresley*" has a particularly realistic appearance when it is running. A remarkable feature is the way in which the movements of the engine reproduce those of the real streamliners. As the Controller handle is moved gradually from the "Off" position towards full speed, the little locomotive gets its train under way in a manner that resembles very closely the startling acceleration that is characteristic of the real "A4" locomotives.

Similarly it has been remarked by many who have seen the models that, when the train is being retarded for a station stop, one is immediately reminded of the sleek blue giants gliding into King's Cross from the North. Even now that the streamliners have become familiar on the L.N.E.R. main line, the characteristic notes of the chime whistle of one of them still causes a flutter of excitement among people in the station. These whistles are a novelty in British practice, not only in their note, but also in their position immediately in front of the chimney. This characteristic detail is included on the Hornby-Dublo model, and gives such a realistic appearance to the front end of the engine that one can almost imagine the little whistle to be capable of emitting the same tuneful notes as the real ones!



Some idea of the splendid appearance of the Hornby-Dublo Locomotives can be obtained from this illustration. The streamlined "Sir Nigel Gresley" reproduces exactly the characteristic outline and detail of the real L.N.E.R. engine, and the Tank Locomotive in the siding is equally realistic.

The Goods Train Set consists of a characteristic 0–6–2 Tank Locomotive with a train made up of a standard 12-ton Open Wagon, a Covered Van and a Goods Brake Van. This Set is produced in the colours and style of each of the four railway companies. The Locomotive remains the same in design in each Set, except that the G.W.R. model has a domeless boiler and carries the safety valve that is typical of most of this company's locomotives. Like the passenger engine "*Sir Nigel Gresley,*" the Tank Locomotive is a splendid little model produced by the pressure die-casting process. The effective appearance of each of these two engines is well shown in the lower illustration on this page.

The tank locomotive is most pleasing in design. The wheel arrangement is a well-known one, for engines of the 0–6–2 type are in use on each of the four big systems. Numerous details are included even to such minute items as boiler bands, washout plugs on the fire-box and the whistle in front of the cab. Steps also are fitted, and the appearance of the engine is most attractive.

The Wagons and Covered Vans represent up-to-date standard types, and are all lettered in the latest style agreed to by the four groups, in which the company initials, the tonnage and the wagon number appear together in the left-hand corner of each wagon side. The Goods Brake Vans are particularly interesting. Each is a true-to-type design, according to the railway represented, and is lettered in the latest style.

All these Goods vehicles have tinplate bodywork mounted on pressure die-cast underframes that are full of detail. Even such items as footboards are provided on the Goods Brake Vans, and the ordinary freight vehicles have their brake gear accurately represented underneath.

All Hornby-Dublo vehicles, both passenger and goods, are fitted with Automatic Couplings of an entirely new design, which will link perfectly at any point of the track. This special feature, in conjunction with the remote control of the locomotives, makes it possible to assemble trains in the most realistic manner.

Hornby-Dublo Track is particularly interesting. Solid-drawn brass rails are securely mounted on a strong metal base that represents realistically the sleepers and road bed of actual practice. Each Train Set contains sufficient rails to form a small oval track. In the Electric Sets one of the rails is a terminal rail, for the connection of the power supply to the track. In addition to the standard length Straight and Curved Rails included in the Sets there are also Half Rails, both Straight and Curved, and Short Rails, which are useful in certain types of layouts with which we shall deal in a subsequent article. There are also Right-hand and Left-hand Points designed in such a manner that two of them can be used together to make up Crossover Points. The construction of these Points is remarkably sound and they are provided with a positive locking lever.

The accessories introduced for Hornby-Dublo railways set a new standard in miniature railway work. Stations and Signal Cabins are constructed in wood, and are designed and finished to represent the modern architectural style that is becoming so popular. There is a Main Line Station long enough to accommodate a three-coach train. The platform is of the correct height for Hornby-Dublo Trains, and part of it is covered by an effective awning. Realistic details are reproduced on the station building itself, and an interesting point is that printed gummed slips giving a choice of four names are supplied with each station. The names selected are "Berwick," L.N.E.R., "Penrith," L.M.S., "Truro," G.W.R. and "Ashford," S.R. There is also an Island Platform and a Goods Depot.

The Signal Cabin is a realistic little structure having characteristic wide upper windows and peaked roof, and small windows below. The Hornby-Dublo Signals are all of the "upper quadrant" type and work perfectly, and there are two Tunnels, one long and one short, of realistic design and finish. The Buffer Stops are of the spring type, with working heads. Finally there are miniature Railwaymen and Passengers to give "life" to the stations.

A Microbe Death Ray

Sterilizing With Ultra-Violet Light

NEW customers of a certain bank in the state of New York are puzzled these days by a curtain of pale bluish light that falls between them and the cashiers, along the grilled windows. For some reason, bank customers try to get as close to the cashiers as possible, and bank employees suffer more than an average number of colds. The radiation emitted by slender thirty-inch tubes at the top of the grills protects the cashiers in this bank from infection.

The installation of these tubes is an indication that effective, economical sterilization with ultra-violet radiation is here. Bacteriologists have known, almost since the days of Pasteur, that ultra-violet radiations would kill microbes. Early attempts to put this knowledge to practical use on a wide scale failed because ultra-violet lamps used in the efforts produced, along with the germ-killing radiation, unpleasant quantities of ozone and heat, have been expensive to make and operate, and have required high intensities of output to produce the necessary degree of sterilization. A solution to the problem cost Dr. Harvey C. Rentschler, Director of Research of the Westinghouse Lamp Division, and his associate Dr. Robert F. James, staff bacteriologist, more than five years of research. Because what they discovered is both a radiation source and a method of using the radiations, it has been formally and formidably named "the Rentschler-James Process of sterilization with ultra-violet radiation." In meat and food shops, at soda fountains and other places where the process is used, this has been shortened to the single word "rent-schlerisation."

The process is both simple and inexpensive. It was known that some portions of the ultra-violet spectrum killed bacteria more effectively than others, but these regions were not exactly defined. Dr. Rentschler's first task was to invent a meter that would measure accurately the amount of invisible radiation of any selected wave-length, or "colour," being emitted by his experimental lamps. His ultra-violet meter, the outcome of this preliminary research, is now used throughout industry.

The next step was to test, tediously and painstakingly, the effect of various ultra-violet wave-bands upon bacteria and other micro-organisms. This task alone could have consumed a lifetime of effort, had not Dr. Rentschler and Dr. James, applying the skill of trained engineers to a problem of science, devised a rapid method of making bacteriological tests. They confirmed the belief of other physicists and bacteriologists that some portions of the ultra-violet were more deadly to microbes than others. Moreover, they found the wave-band that appeared to be the most effective. This microbe death ray is harmless to human beings.

With this knowledge, they undertook to devise a lamp that would be sturdy, inexpensive to make and operate, and of such shape as to provide the greatest germ-killing power over the area to be sterilised. They knew in the beginning that some sort of gas-discharge lamp would be required. Also, it would have to contain a bit of mercury vapour, for this vapour emits the ultra-violet spectrum strongly, and is rich in the effective "colour." Combined with the mercury there would be required several other light-emitting gases, whose mutual effects in the discharge of electricity passing through the tube would be to heighten the emission of the light required and suppress that of light of other wave-lengths. When these matters had been settled, there still remained a special problem. Ordinary glass is opaque to the microbe death ray. Drs. Rentschler and James made a search to discover whether any kind of glass would transmit this wave-length, and found their answer in a special glass that is particularly free from iron, a metal that strongly absorbs the bacteria-killing wave-lengths.

The first "Sterilamps" were thus created in the laboratory of the Westinghouse Electric and Manufacturing Company at Bloomfield, New Jersey.

When news of the Sterilamp reached the medical profession, Dr. Deryl Hart, Surgeon-in-Chief of Duke Hospital, Durham, North Carolina, immediately asked for a chance to experiment with it. In preliminary tests wounds in animals were exposed to the radiation for periods varying from thirty to ninety minutes without apparent damage. Healing in fact seemed to be more rapid. Beneath the Sterilamp, operations were then performed on patients, and from the first the results were striking. While the bactericidal radiation did not eliminate more than 80 to 90 per cent. of the bacteria in the extreme corners of the room, it did kill virtually all the bacteria in the air about the operative wound, supply and instrument tables. Operating room infections, which were a constant hazard before these tubes were installed, practically disappeared. The post-operative temperature curves of the patients were much lower than previously, and those major operations performed with the radiation showed no infection. As a result of Dr. Hart's successful experiments, which have been in progress for nearly two years, Sterilamps have been installed in many other hospitals, with excellent results.

Sterilizing drinking glasses by means of Sterilamps. The ultra-violet rays from the long tubes destroy bacteria on the glasses in the installation. Photograph by courtesy of the Westinghouse Electric and Manufacturing Company, Pittsburgh, U.S.A.

Another problem to which the Sterilamps are readily applied is that of sterilizing drinking glasses and other utensils in restaurants, bars and soda fountains. In a recent survey conducted on glasses in several New York City soda fountains picked at random, water glass rims produced 37, 112, 225 and 330 colonies of bacteria. Milk glasses produced 114 colonies; fruit juice glasses 115 and 444. In another test twelve office workers were asked to kiss sterile plates. Each kiss produced from 10 to 560 bacterial colonies!

So well known has this condition been that years ago the majority of states and hundreds of communities passed what were meant to be stringent ordinances requiring the sterilization of eating and drinking utensils. Forty-six states to-day have such laws on the books, but in general they are not enforced, because it is recognised that none of the sterilizing tools is practical. Moreover, even though the glasses are adequately sterilized between customers, there is nothing to prevent air-borne bacteria from coming in contact with them as they sit idle on the shelves. To meet this problem, Sterilamps are installed in series along the inside baffles of bars and soda fountains, in wire glass-holders or any other convenient form. They operate at temperatures only four or five degrees above room temperature. They give 99.99 per cent. sterilization in a few seconds' time and maintain constant sterility to the time of using.

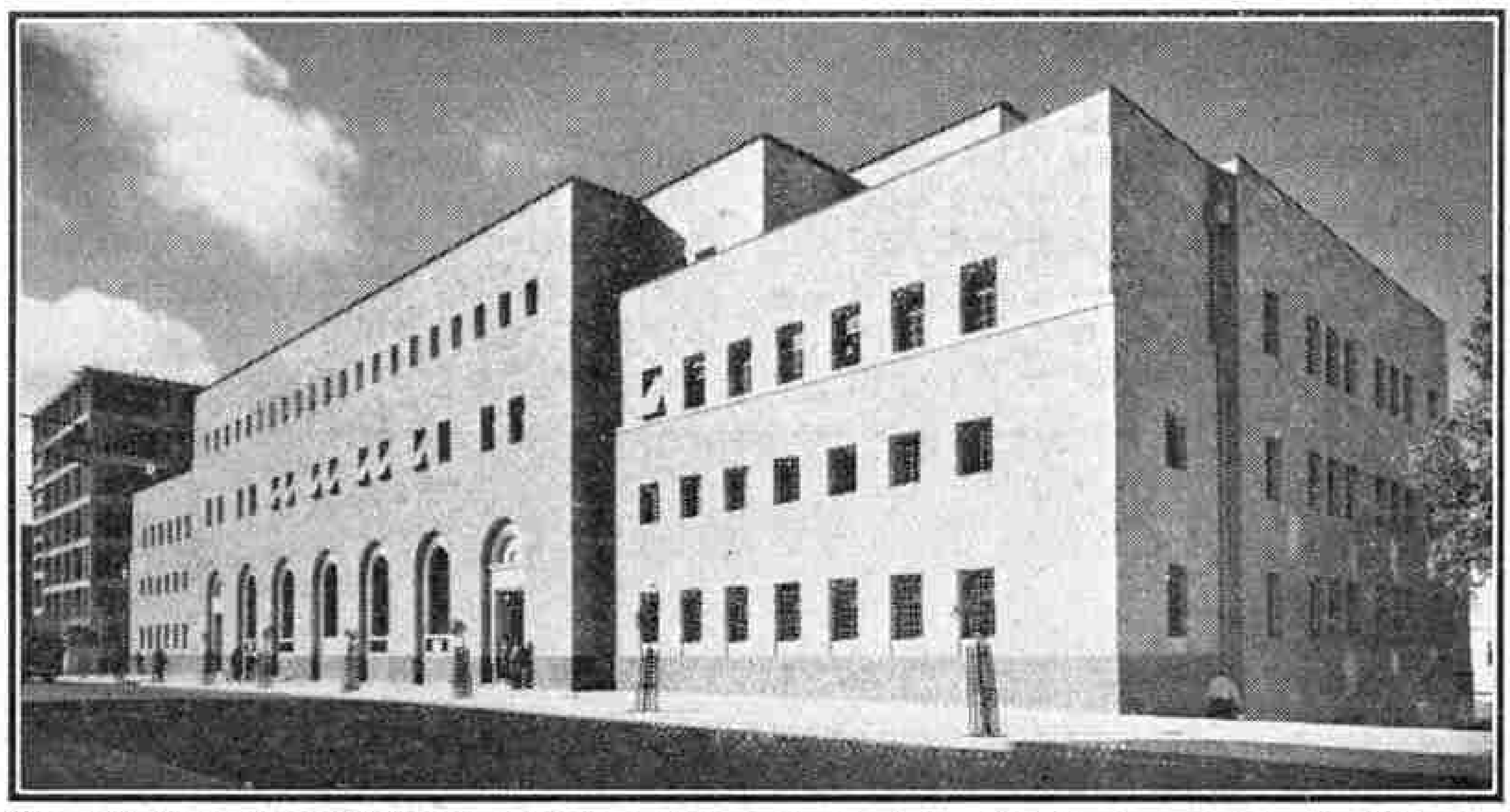
Probably the greatest commercial demand for lamps is now developing in the field of meat and perishable food storage. Other applications are being tried and the slender tube, with its faint bluish glow, may soon be a familiar and healthful landmark.

The New G.P.O. in Jerusalem

Marble Palace for Palestine's Mail

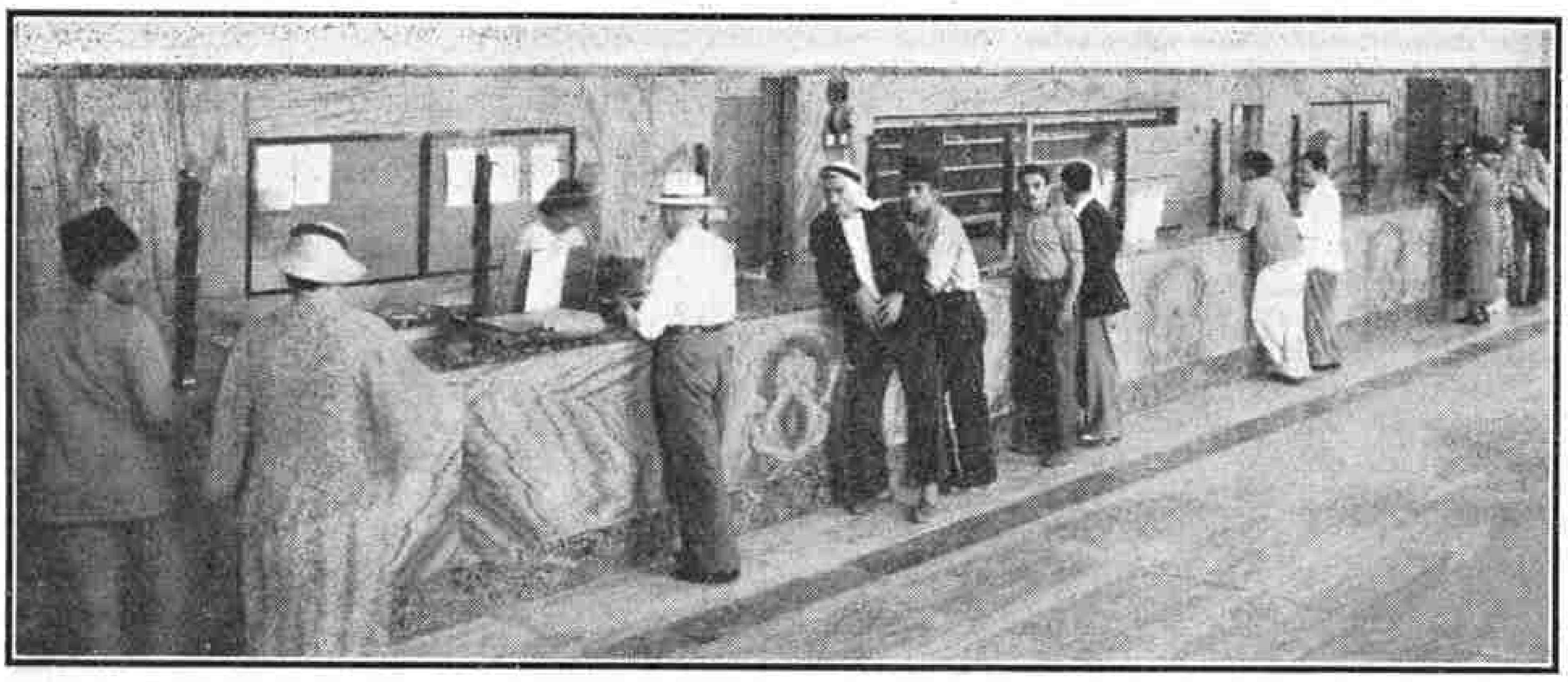
By Harold J. Shepstone, F.R.G.S.

THE new General Post Office building recently opened in Jerusalem is without question the most imposing structure of its kind in the Middle East, and one worthy of the historic city and country it is destined to serve. It is a veritable marble palace equipped with the very latest devices for the rapid handling of letters, parcels, telegrams and telephone messages. Egypt, Syria, Iraq and Turkey have nothing to compare with it. It is the largest building yet erected by the Palestine Government and cost £120,000, the only Government building in the country costing more being the Palestine Archæological Museum erected from Rockefeller funds.



The new General Post Office in Jerusalem. This is the largest building yet erected by the Palestine Government and is equipped with the most modern devices for postal work of all kinds.

The new building, which not only houses the administrative and engineering staffs of the Departments of Posts, Telegraphs and Telephones, but also the Central Telephone Exchange and the Jerusalem Post Office stand on the Jaffa Road, about a quarter-of-a-mile from the Jaffa Gate, not far from Zion Corner. The main frontage is on the Jaffa Road, and its rear on a lower level in Storrs Avenue. The building was originally planned by Mr. Harrison, but it has been built under the supervision of the present Government Architect, Mr. Percy H. Winter. Grey, hand-cut stone from the quarries at Beit Safafa, near Bethlehem, is the main building material used. The black basalt that forms the base or the plinth of the building serves the purpose of introducing not only a little-used Palestinian building stone to Jerusalem, but one that will prevent the soiling that always occurs at street level from showing. Basalt is used also for the coping stones of the parapets. On a clear day with bright sunshine, this gives an effect of a black line on the lighter stone, and provides a needed definition of the structural masses against the skyline.



Men of many nations at the counter of the new post office. The counter and walls are of marble.

On the Storrs Avenue side of the building there is a projecting stone canopy or cornice, high up, above a long array of small windows. The small windows bring light into the main apparatus room of the telephone exchange. While light was wanted, it was desirable to exclude direct sunlight. The use of shutters was prevented by the fact that each of these windows is under lock and key, necessitated by the artificial ventilation in the room, and the position of the cornice therefore has been carefully calculated to prevent the sunshine from penetrating the windows. The artificial ventilation extends only to those parts of the building housing the telephone exchange. The delicate mechanisms used there require that the air be washed and filtered and the humidity controlled.

Earthquake precautions presented special construction problems. The building is erected on pillars that were sunk to varying depths until solid rock was found, excavation for the foundation calling for the removal of 6,000 cu. m., or nearly 8,000 cu. yds., of solid rock. The stone work of the building is anchored to the reinforced concrete framework by steel work, and is designed so that the walls and frame would stand—or fall—together in the event of an earthquake.

It was important to plan the building in such a way that each post office entity should be able to operate with a minimum of crossing into the sphere of other departments. Particular care has been taken to place those sections having business with the public as near together as possible. Thus the buying of stamps, facilities for mailing, the post office boxes, customs examination, etc., are concentrated on the Jaffa Road ground floor, while the place for signing telephone contracts and registering complaints is on the mezzanine floor. In order to allow the carting to and fro of heavy packages without interfering with normal traffic, the entrance to the parcel post department is on the ground floor on Storrs Avenue. The first floor contains the administrative and engineering offices, and the second floor the telephone exchange.

Special provision has been made for the employees. On the second floor is a women's rest room, containing upholstered easy chairs and couches. Here too are a spacious kitchen, scullery and larder, and two attractive lunch rooms. The larger restaurant can seat about 100 persons and the smaller one 30.

Designed primarily for use, every detail of the building has been carefully considered in relation to this basic idea. The stamp counters offer an example of this. It seemed logical to carry up the marble with which the walls were lined to form the counter. Marble is so hard wearing that it furnishes a firm and long lasting surface, but it is too cold for clerks to work at with comfort for hours at a time, so the section behind the counter screens has been designed in oak.

Green cippolino marble, which contains mica, is used for the walls in the public halls, and grey dove marble, panelled with strips of cippolino, for the flooring. Travertine, with a gold cast, forms the walls in the two lobbies. This is especially attractive and the rich design spreads repeatedly like a Persian carpet. The steps and flooring of the main entrance have been constructed of dove marble.

Another interesting detail is the use of "neutral" glass in the two long galleries overlooking the room used for gathering and sorting the mails. This is transparent from the inside, but presents the appearance of a black opaque glass from the outside. Behind this glass unseen inspectors can observe every movement of the postal staff in dealing with the property of the public as sent through the mails.

The contours of the land made basement space available, and the treasury strong room is located here, surrounded by heavily reinforced walls. The basement also contains two large cisterns, each having a capacity of 400 cu. m., or nearly 88,000 gallons of water.

The Douglas "Sky Sleeper"

First Air Liner Built for Night Travel

THE largest producer of air line equipment in the world is the Douglas Aircraft Company, the famous United States firm whose liners are employed on air routes in North and South America, in China and Japan and by air transport concerns in Europe. The home of this company is at Santa Monica, in California, where there are now buildings with 700,000 sq. ft. of floor space adjoining an aerodrome with a paved surface. The latest addition is a final assembly unit, with a single-arch roof, the doors of which when fully opened can admit aeroplanes with a wing spread of 250 ft.

The story of the firm goes back to 1920, when it was founded by Donald Wills Douglas, who had not long completed his training at the United States Naval Academy and the Massachusetts Institute of Technology. Afterwards he had gained valuable practical knowledge by working for several aircraft manufacturers, and through his appointment as civilian aeronautical engineer for the United States Army Signal Corps.

The first aeroplane produced by the Douglas company was known as the "Cloudster," and was designed to fly non-stop across the United States, a feat then unaccomplished. The attempt had to be given up owing to engine failure, but the experience that had been gained led to the company's entering into competition for Government orders, and in 1924 they began to make aircraft for the United States Army. They achieved a striking success immediately, for three of their aircraft were flown by United States Army pilots in the first aeroplane flight round the world. Government contracts kept the company fully engaged for many years in producing military aeroplanes. These were chiefly two-seater trainers and two-seater observation biplanes, but experimental amphibians and flying boats were also produced for the United States Army Air Corps.

CESKOSLOVENSKA LETECKA SPOLECNOST
OK-AIH

This photograph of a Douglas DC-3 owned by an air transport company in Czechoslovakia shows the graceful streamlining of the fuselage. The illustrations to this article are reproduced by courtesy of the Douglas Aircraft Company, Inc.

In 1932 there came a departure from the company's tradition. By that time commercial aviation had got well into its stride and there was a growing demand by air transport companies for reliable commercial aircraft. For instance, Transcontinental and Western Air, Inc., were requiring a fleet of twin-engined air liners with a guaranteed performance better than that of any commercial aeroplane then in existence or contemplated. Douglas decided to compete with other aircraft producers for this valuable contract. Time was short, however, so the company's General Manager and Chief Engineer hurriedly packed their suitcases and caught the first train to New York. For four days they sat at a table in their Pullman stateroom, the General Manager carefully calculating production costs and the Chief Engineer working out the performance figures of the proposed Douglas "Transport" 14-passenger air liner, and the result of their determined attack was that T.W.A. ordered a fleet of 26 "Transports."

One of the conditions of the contract for the new air liners was that with one of their two engines shut off after travelling about half the take-off run, they should continue to climb with full load on the other and proceed to the next available airport. The Douglas DC-2 "Transport" satisfied this exacting condition, and it is also interesting to note that it proved capable of a top speed of 213 m.p.h. instead of the 183 m.p.h. promised.

The early "Transports" proved so successful in service that Transcontinental and Western Air, Inc., increased their order to 41 machines. Air transport concerns in America and other parts of the world became interested, and by September 1935 a total of 120 of these 14-passenger monoplanes had been ordered. An illustrated description of the DC-2 "Transport" was published in the September 1935 *"M.M."*

The great success of this aeroplane and the rapid development of long-distance air routes led the Douglas company to consider producing an air liner designed particularly for night flying. It was realised that its cruising range and carrying capacity would have to be greater than those of the "Transport," and that it would have to be even safer in normal flying as well as in emergency. In December 1934 the Douglas engineers began projecting this proposed new aeroplane on paper, helped greatly by the knowledge and experience they had gained in the development of the "Transport." Month followed month while a staff of some 400 engineers and draughtsmen produced over 3,500 individual drawings of the new aeroplane. Every proposed screw, the detail of each unit, the arrangement of every part, was carefully planned, and even then a design frequently was rejected for a better, stronger way of doing it.

At last the basic design was developed, and the engineering staff then turned to the big wind tunnel in the California Institute of Technology, Pasadena, in order to see how a small-scale model of the new aeroplane behaved in the swift stream of air driven through the tunnel by means of a powerful fan. The speed of the air flow corresponded to one of 200 m.p.h. on the full scale. The model was one-eleventh of the size of the aeroplane that was being planned, its wing span being about 8 ft. 6 in., and nearly 300 separate tests were made with it suspended upside down, the plan adopted in such experiments for greater convenience in making measurements. The contour and shape of all surfaces and their positions were fully analysed, and three complete wings, with various tail surfaces, landing gears and tail wheels and other units, were fully tested in order to find the best performance, stability, and control for the completed machine.

Then began the construction of a full-size model, or "mock-up" as it is called, of wood. The purpose of this was to provide a means of finding the best arrangement of the many interior details that go to make up the finished air liner. When the interior was completed a dozen or more different designs of passenger seats, built to the minutest detail, were installed and tested, and various arrangements of seats and berths were tried in the search for a combination giving the greatest roominess and comfort.

This extensive preliminary work cost about £80,000, and only when it was completed did the construction of the actual air liner begin. Each unit in its final form was carefully constructed, and then subjected to a long series of tests designed to magnify every conceivable strain and stress that the aeroplane might encounter in the most extraordinary conditions in flight. There were static tests, load tests, torque tests, bending tests, and others to prove the riding quality of the undercarriage and of the tyres fitted to it. In each case every unit and every member had to prove itself able to withstand many times the actual load or strain it would carry in service.

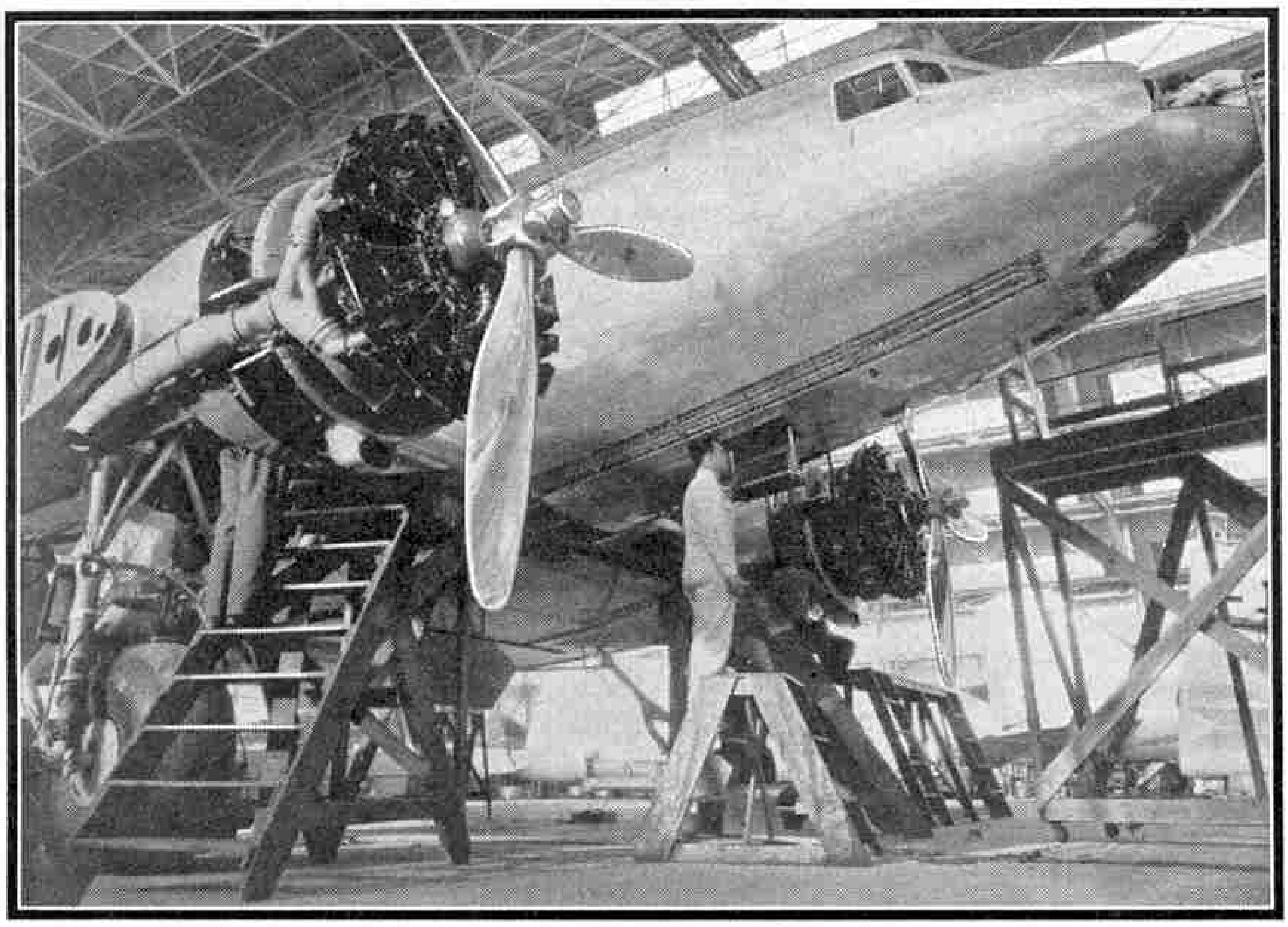
The assembly of the first Douglas "Sleeper Transport" then began, and on 17th December 1935 it reached the end of the production line. The first American air liner to be designed and built primarily for night travel was ready to try its wings! It was wheeled out through the big doors of the assembly shop on to the adjacent Clover Field, the aerodrome at the Douglas works, and during the next few weeks it underwent a series of test flights to double check and prove in the air all that had been determined in theory on the ground. For this purpose intricate testing equipment was set up inside the cabin to measure deflections, vibrations, sound, and numerous reactions to every type of flying manœuvre. Special motion picture cameras were even installed in the cabin to record movements of the wings that the human eye could not see, and not until these exhaustive tests were over did the critical engineers give the new aeroplane their complete approval.

A Douglas "Sleeper Transport" of Transcontinental and Western Air, Inc., in flight. It is equipped with upper and lower berths and at night provides sleeping accommodation for 14 passengers.

TWA
LUXURY
SKY-SLEEPER

The Douglas "Sleeper Transport," or "Sky Sleeper" as it is familiarly known, is a low wing twin-engined monoplane luxuriously furnished to provide sleeping accommodation for 14 passengers, and daytime seating for double that number. It takes off after a run of 980 ft. when it is fully loaded, and it can climb to a height of 23,100 ft. Even with one engine stopped it can maintain level flight at 9,500 ft. Its two Wright "Cyclone" G series engines give it a top speed of 212 m.p.h. at 6,800 ft. These engines are supercharged. They are rated at 850 h.p. at 2,100 r.p.m. at a height of 5,800 ft., and 1,000 h.p. is available for taking-off. Alternatively, the aircraft can be fitted with Pratt and Whitney "Twin-Wasp" SB-G engines, also of 850 h.p. rating, and in this case the performance figures are slightly lower than when "Cyclone" engines are employed.

The 95-ft. wing has a straight trailing edge, but the leading edge is swept back, so that the wing tapers considerably toward the tips. It consists of outer panels with detachable tips, and a centre panel that is an integral part of the fuselage. This centre panel contains the nacelles for the engines, provision for the undercarriage when this is retracted, and the four fuel tanks. Hydraulically-operated flaps are fitted to the trailing edge of the wing. As a precaution against the formation of ice during flights, the leading edge of the wing is equipped with a rubber shoe into which air is pumped and then released. This pulsing movement breaks off any ice as it forms, the ice being blown away by the slipstream. The hubs of the airscrews are also equipped with a device that ejects a liquid on to them in order to prevent ice formation.



Assembling a Douglas DC-3. The engineers are making adjustments to the recently installed engines, after which these will be covered with streamlined cowlings.

The fuselage of the Douglas D.S.T. is longer and wider, and is more effectively streamlined than that of the DC-2 from which it was developed. It is an all-metal structure designed to withstand stresses many times greater than are experienced in actual operation. The undercarriage can be raised or lowered within seven seconds, and its shock-absorbing mechanism is so effective that the aeroplane can land without disturbing even the lightest sleeper among the passengers. The retracting gear, wheel braking system, and wing flaps are operated by a hydraulic system that is worked by two engine-driven oil pumps. There is an auxiliary hand pump for use in emergency.

The pilots' cabin is well forward of the wing. It has shatterproof glass windows that are movable, and each of the two pilots can reach outside to clean them. Reflections are minimised by the design of the compartment and by the use of a dull green colour for the finish of the interior.

A modern air liner is equipped with a formidable array of levers, knobs and dials, and the pilots' cabin of the "Sleeper Transport" contains 115 instruments and controls. The instrument board is mounted so that there is as little vibration as possible, and the instruments are clearly visible to both pilots. Radio and automatic flying control devices help to make travel safe. The pilots keep in touch with ground stations by radio telephone, and approaching aeroplanes report by similar means their positions and the weather they have passed through. Weather reports are received periodically during a flight, and the aircraft is equipped to take full advantage of the radio beams that mark the highways of the air. The automatic pilot is attached to the controls, and this steers the air liner straighter, more evenly, and with less motion than the most expert hand.

Immediately behind the pilots' compartments are two mail and freight compartments, and farther aft is the main cabin, which is 19 ft. 5½ in. long and comfortably accommodates 12 of the 14 passengers. It is 6 ft. 4½ in. high, and ceiling-height partitions divide it into six sections, three on each side of a wide aisle. In each section there are two 3-ft. wide upholstered seats facing each other for daytime travel, and these make up into a lower berth at night, the headrests folding down to form a shelf. The upper berths are 2 ft. 6 in. wide, and with their mattresses fold up into the ceiling when not in use. When made up for sleeping, both the lower and upper berths are 6 ft. 5 in. long, and have individual curtains for complete privacy. When sleeping accommodation is not required there is ample room for 24 passengers, for the seats are wide, and there is a reading light, a removable table and a ventilator for each berth.

A novel feature of the "Sleeper Transport" is the Sky Room, an enclosed compartment in the forward part of the fuselage on the right side, for passengers who desire complete seclusion on their air journeys. It provides sleeping accommodation for two persons and daytime seating for four, and is equipped with an upper and lower berth, wash-basin and mirror. Each seat, as well as the upper berth, is provided with its own window, reading light, ventilation control, and call button.

The Douglas "Sleeper Transport" has a companion aeroplane called the DC-3, 21-passenger "Day Plane," in which the seats are arranged in pairs on one side of the aisle and singly on the other. The DC-3 is in service over many air routes in North and South America, in Europe, and in the Orient. There is also a 14-seater luxury version called the DC-3 "Club Plane," the upholstered lounge chairs in which can be rotated by merely pressing a button conveniently fitted on the arm of the chair.

The latest Douglas air liner is the recently completed DC-4 illustrated in last month's *"Air News"* pages. This huge four-engined monoplane will be described fully in an early issue.

RAILWAY
NEWS

L.N.E.R. Developments in East Anglia

The L.N.E.R. Locomotive Depot at Halifax Junction, Ipswich, is to be modernised. New workshops and stores for the Permanent Way Engineering Department are to be erected on a new site. The existing Engineering Workshops at Halifax Junction will be demolished and the space left will be incorporated in the Locomotive Depot.

The improvements to the latter Depot include a new engine shed having six sets of rails running through it, a mechanical coaling plant with a bunker of 250 tons capacity, and an articulated 70-ft. turntable of the modern type. Other up-to-date equipment will include ash-pits, hot water washing-out plant, wheel-drops, preparation pits and water tanks. The whole of the machinery in the machine shop will be converted from steam to electric drive, and additional electric lighting will be installed in the Depot.

The increased number of electric restaurant cars now in service on the L.N.E.R. in East Anglia has necessitated the installation of additional electrical charging points at Liverpool Street, Stratford and Ipswich; it has also become necessary to re-position four existing electric pre-heating points at Parkeston Quay. These pre-heating points are used to provide electrical energy for the restaurant cars standing in the sidings or waiting to commence their journey, when they are not deriving electrical energy from the axle-driven dynamos.

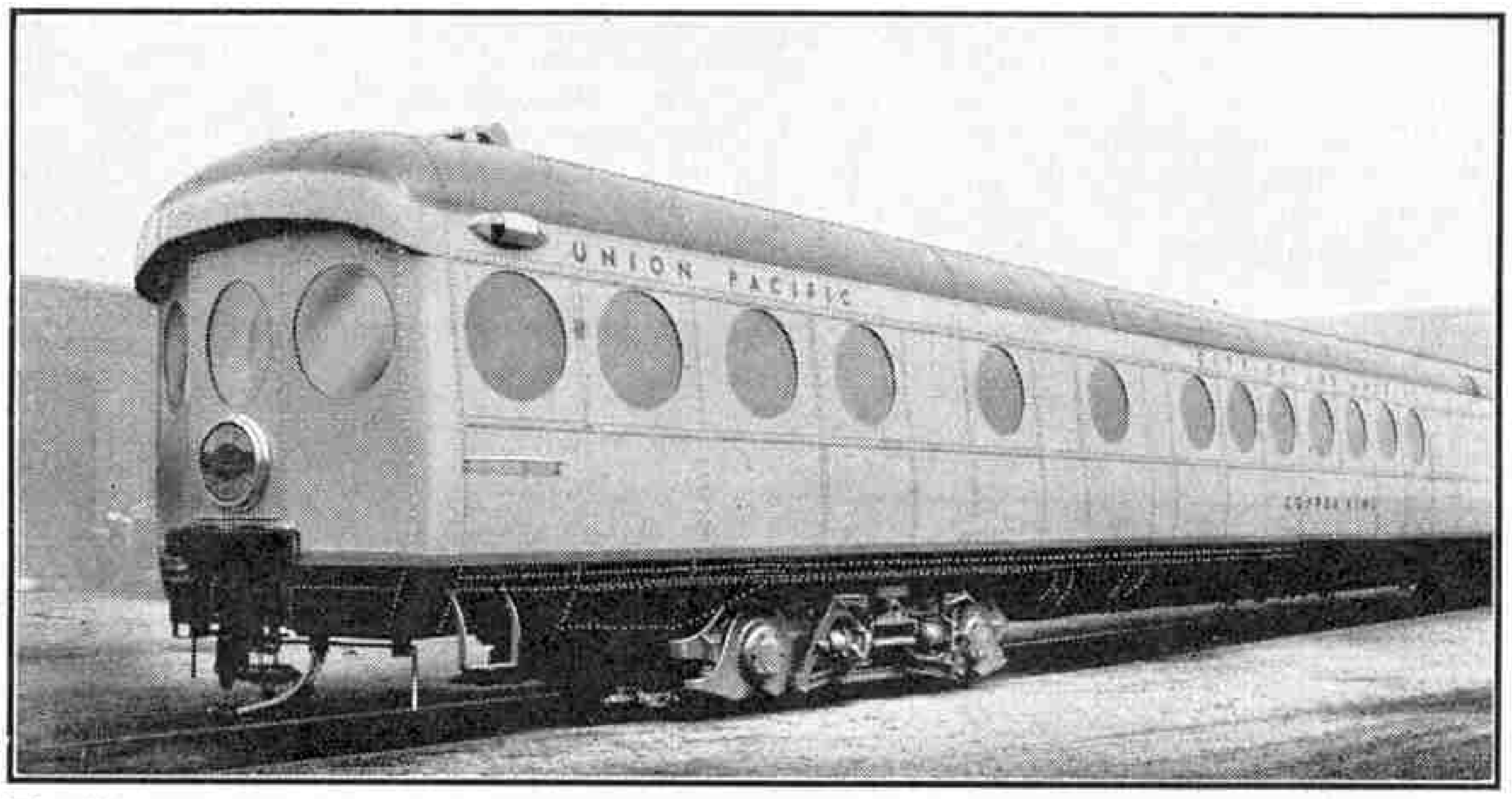
The L.N.E.R. have decided also to modernise the refreshment rooms at Cambridge, Ely, March and Boston Stations.

New L.M.S. Diesel-Electric Shunters

The L.M.S. have ordered equipment for 20 six-coupled Diesel-electric shunting locomotives of 350 h.p. The Diesel engines and all electrical equipment for these locomotives will be manufactured by contractors, but the locomotives will be assembled in the L.M.S. Works at Derby. With the introduction of these new locomotives, which will be employed on general shunting duties and for intensive "hump-shunting" at selected marshalling yards, the total L.M.S. fleet of Diesel and Diesel-electric locomotives will be increased to 50.

Automatic Train Control on the L.N.E.R.

The L.N.E.R. have for some time been giving careful consideration to the question of automatic train control, and they have decided to install the Hudd system experimentally on their main line between Edinburgh and Glasgow. This section of line consists of 47 miles of double track, and is specially suited for the experiment on account of the density of traffic and the self-contained character of the engine working. It is proposed to equip the whole section and to fit 250 engines with the apparatus in the first instance.


The "Copper King," the streamlined Union Pacific observation car described on this page. Passengers in it control the amount of light they receive. Photograph by courtesy of the Union Pacific Railroad.

The Hudd system includes a non-contact inductive apparatus, the function of which is to ensure that when a distant signal is passed at "caution," a horn is sounded in the cab of the engine and a partial application of the brake is made automatically. This is sufficient to bring the train to a stand before the home signal is reached.

The L.N.E.R. have decided to experiment with this type of control because they are of opinion that recent improvements make an induction system of operation preferable to a contact system. They also attach importance to the fact that this system is being developed on the L.M.S., with which company they have a considerable exchange of mileage.

L.N.E.R. Locomotive Identification Scheme

To facilitate the identification of locomotive classes by the operating staff for the purpose of train loading, the L.N.E.R. have now begun to paint the classification of each locomotive in the centre of the buffer beam, at the lower edge. This arrangement is a reversion to the standard practice of the former North Eastern Railway.

Light Conditioning in American Train

One of the Diesel-electric trains of the *"City of Los Angeles"* transcontinental service of the Union Pacific Railroad is being increased to include 11 cars and a twin-unit Diesel locomotive. The most important addition to the train will be the new observation lounge car shown in the illustration on this page. This car is named *"Copper King,"* and is provided with internal decorations of sparkling copper. Its most remarkable feature is the "light-conditioning" apparatus, the first of its kind introduced in any railway vehicle.

The "light conditioning" is accomplished by the use of Polaroid variable-density windows, of which there are 29. They are circular and 28 in. in diameter, and each consists of two laminated discs, one over the other, mounted so that the outside disc is stationary while the inside one can be revolved by turning a knob. In this way passengers have direct control of the Sun's rays entering the coach.

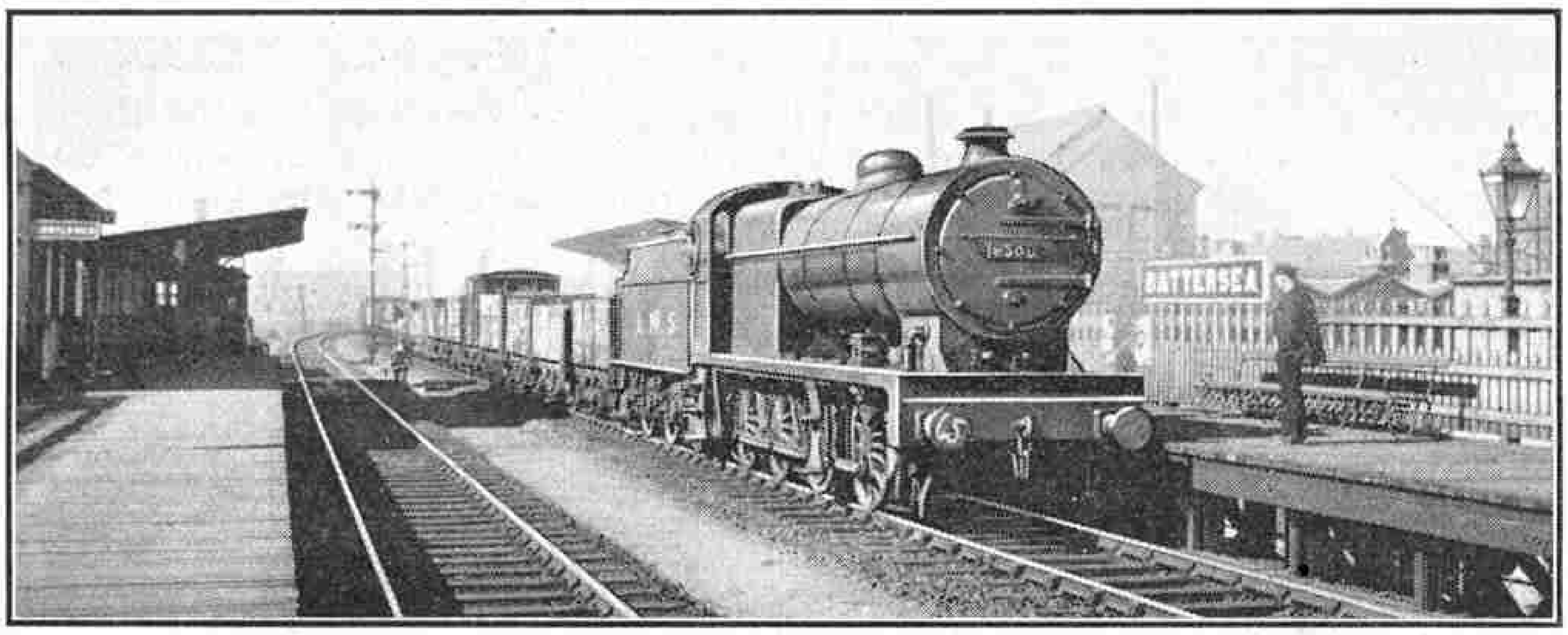
The effect of the system is described as almost miraculous. For the first time Union Pacific passengers are able to condition the light to their own individual desires, and because of the control of the reflected glare given by the outside disc colours appear richer and brighter than they do to the unaided eye, as they are no longer diluted by glare. It is not even necessary to draw curtains to insure privacy at night, for when the windows are turned to the "dark" position they will appear black to the people inside the car, and from the outside will be seen as very faint purplish discs.

New L.M.S. Container Plant

The L.M.S. are making important developments at the wagon works at Earlestown in order to expedite the manufacture of containers. Under the new scheme this work will be undertaken in a new layout, which is in course of installation in what was formerly the Wheel Shop. New high-frequency tools, overhead runways, staging, lighting, heating and other equipment will be provided. When the new plant is ready it will have an output of from 800 to 1,000 containers per annum, and it is understood that it will be possible to build a container in the short time of about two working days.

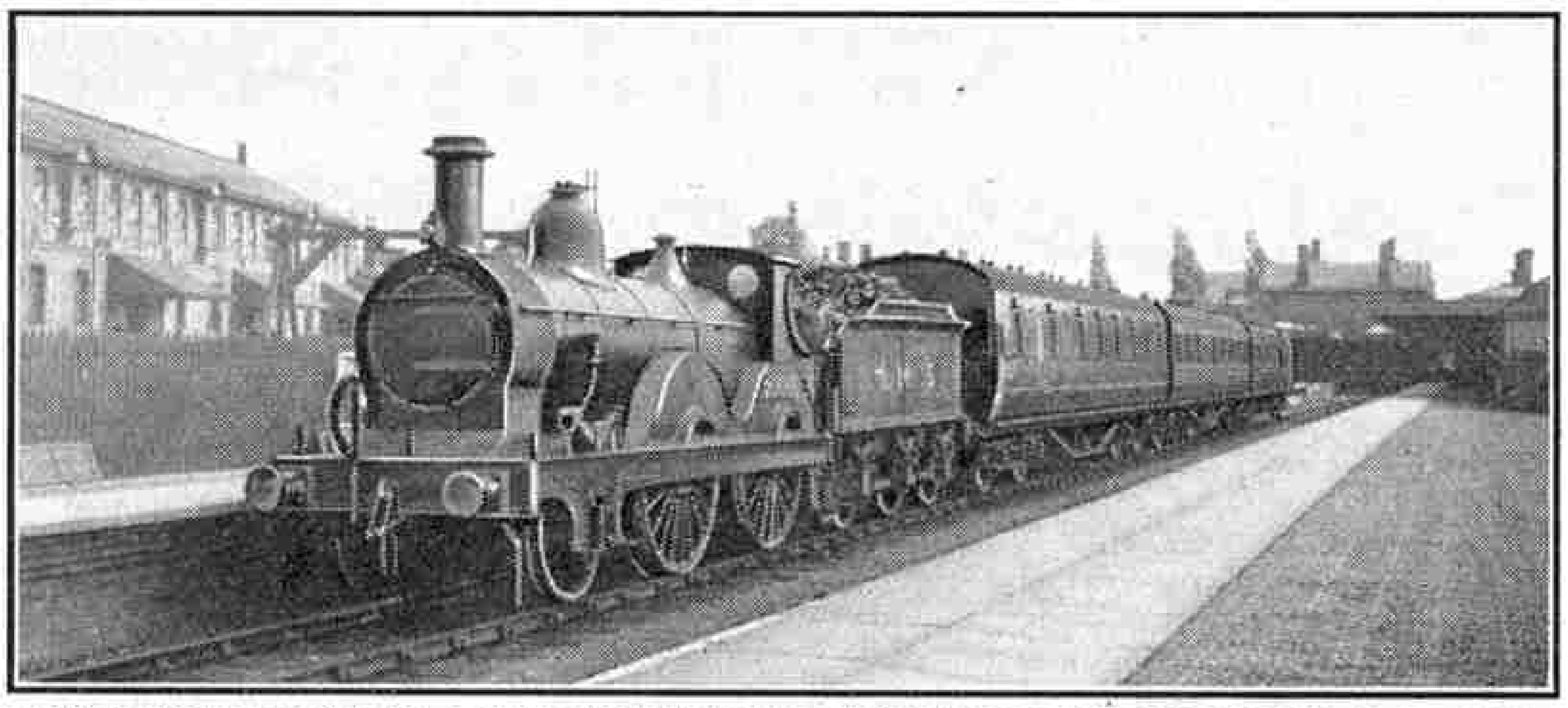
The 1888 *"Flying Scotsman"* on Tour

In response to widespread public demand the L.N.E.R. recently arranged for the Stirling locomotive No. 1 and the period *"Flying Scotsman"* train of 1888 to be placed on exhibition at various points on the system. Every one of the 170 seats was taken on a public excursion run by this locomotive and train from King's Cross to Cambridge, and a further guaranteed excursion from London to Peterborough was arranged for Sunday, 11th September. The old locomotive and train were then exhibited at Alexandra Palace Station, London, at Central Station, Manchester, at Sheffield and at Leeds.


L.M.S. 0-8-0 freight locomotive No. 9503 on the second section of a regular goods train from Willesden to Norwood Junction on the S.R. The goods working number is chalked on one of the engine's buffers, the numbered disc being carried on the engine of the first section. Photograph by W. P. Conolly.

At Leeds special arrangements were made for the celebration of the first birthday of the *"West Riding Limited"* streamlined express train, which went into service on 27th September last year; the old locomotive was on view together with No. 4468 *"Mallard,"* one of the streamlined engines. To render the contrast more effective, the old engine was placed directly in front of the modern locomotive.

"Mallard" was built at Doncaster Works in the spring of the present year, and differs from the *"Golden Fleece"* and *"Golden Shuttle"* locomotives, which usually haul the *"West Riding Limited"* train, only in having a double chimney. It is the engine that on 3rd July last attained a sustained speed of 125 m.p.h., with a maximum speed of 126 m.p.h., when descending the bank between Grantham and Peterborough. This speed is a world record for steam traction.


L.M.S. 2-4-0 locomotive No. 20092 at Northampton. This former Midland locomotive is one of the few survivors of this wheel arrangement in service. Photograph by D. S. Barrie.

The Stirling locomotive and train are to be shown to the public also during Civic Week at Norwich, that is from 24th to 29th October.

Twin-Unit Railcars for G.W.R.

An order for 20 more railcars has been placed by the G.W.R. to supplement their existing fleet of 18 cars. A feature of the order is the construction at Swindon, for the first time, of the underframes, bogies, brake-gear and coach work. The design will generally follow that of railcar No. 18, now in use on the Lambourn branch, which is capable of hauling an additional coach, horse-boxes or of doing light shunting. This vehicle was described in the *"M.M."* for May 1937.

Various improvements and modifications will be incorporated in the new cars with a view to giving smoother and more efficient running. All controls will be of the electro-pneumatic type, so that two or more cars may be coupled together, as required, and run as a single train, controlled by one driver.

Four of the cars will be coupled together in pairs to form twin-car trains for express services, and will have a maximum speed of 70 m.p.h. They will have buffet facilities and will accommodate 104 passengers. The present cars, which have been giving a business service between Cardiff and Birmingham for the last four years, have developed the traffic beyond their own capacity, and will be replaced by the new vehicles.

All the cars will be fitted with the G.W.R. system of automatic train control.

Engines Named after Famous G.W.R. Engineers

The memory of two men famous in railway history, Isambard Kingdom Brunel and Sir Daniel Gooch, is perpetuated by the naming after them of two G.W.R. "Castle" class locomotives.

Brunel was the company's first Engineer. He planned and built the line from Paddington to Bristol; he was the originator and champion of the broad gauge and the builder of Box Tunnel. He also designed Clifton Suspension Bridge, which was completed after his death as a memorial to him.

Daniel Gooch was the first G.W.R. Locomotive Superintendent, founder of Swindon Works and designer of famous locomotives. Later he became Chairman of the company. He was the champion of the Severn Tunnel scheme and superintended the laying of the first transatlantic cable, work for which he was knighted.

The names *"Gooch"* and *"Brunel"* were previously carried by two 4–4–0 engines built in 1894. With two other similar engines, *"Armstrong"* and *"Charles Saunders,"* they formed a class of their own, each of the four locomotives being named after a prominent G.W.R. officer.

Lights "Specials" for Blackpool

Nearly three quarters of a million people will have been conveyed by the L.M.S. to Blackpool during the period of the Illuminations, which terminates on the 24th of this month. The transportation of this vast number from over 300 centres in England, Scotland and Wales will necessitate the running of 1,456 excursion trains. The heaviest weekend for handling traffic was that commencing Saturday 24th September, when over 200 excursions were dealt with at the Blackpool stations.

Carrying Water by Rail

The conveyance of Loch Katrine water 400 miles by train is an unusual freight traffic development that has recently taken place on the L.M.S. Railway. This water is required in London for distilling purposes. The empty casks are collected by the L.M.S. and loaded at Buchanan Street Station, Glasgow.

L.M.S. Veteran Locomotive's 67 m.p.h.

The only tender engine survivors on the L.M.S. of the once popular 2–4–0 wheel arrangement are those of the former Midland Railway. Although superseded by modern locomotives on all but the lightest duties, they are still able to show a good turn of speed when opportunity offers. No. 20092, shown in the illustration on this page, was built as long ago as December 1872 but recently attained a speed of 67 m.p.h. under the management of Driver Hodgett, of Kettering, while hauling the 3.40 p.m. express from Northampton to Leicester. This train in summer conveys a through coach off the northbound *"Sunny South Express,"* and is still sometimes worked by a 2–4–0 engine.

The load on this occasion was 115 tons. For the first 13 miles out of Northampton there is a steady rise against the engine, culminating in 1 in 100 on the last $1\frac{1}{2}$ miles up to Kelmarsh Tunnel, on which gradient the veteran's speed fell from 51 to 43 m.p.h. A fast descent into Market Harborough, with a maximum of $63\frac{1}{2}$ m.p.h., brought the train into that place in 25 min. 17 sec. for the 18 miles from Northampton. The ensuing $5\frac{3}{4}$ miles to Kibworth were run in 9 min. start to stop, with a maximum speed of 54 m.p.h. Finally the $6\frac{1}{2}$ miles from Kibworth to passing Wigston were covered in 8 min. 20 sec., with a maximum of 67 m.p.h. before the latter place. But for concluding signal checks the $10\frac{1}{4}$ miles from Kibworth to Leicester would have been run in about 13 min. start to stop.

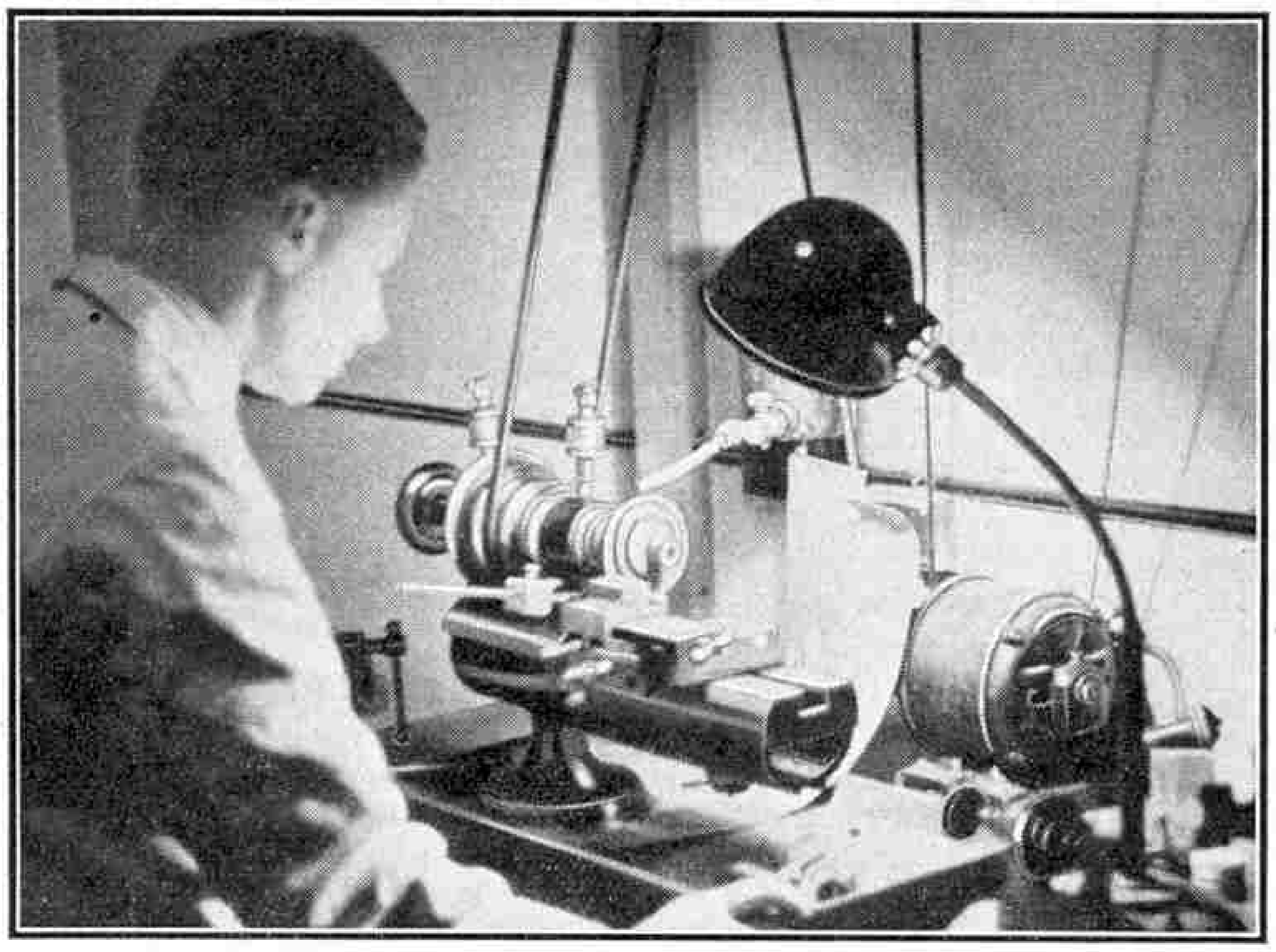
Mr. D. S. Barrie timed this interesting little journey behind one of the oldest locomotives still in regular passenger service in Great Britain.

Electro-plating "Stampers"

Discs from which Gramophone Records are Made

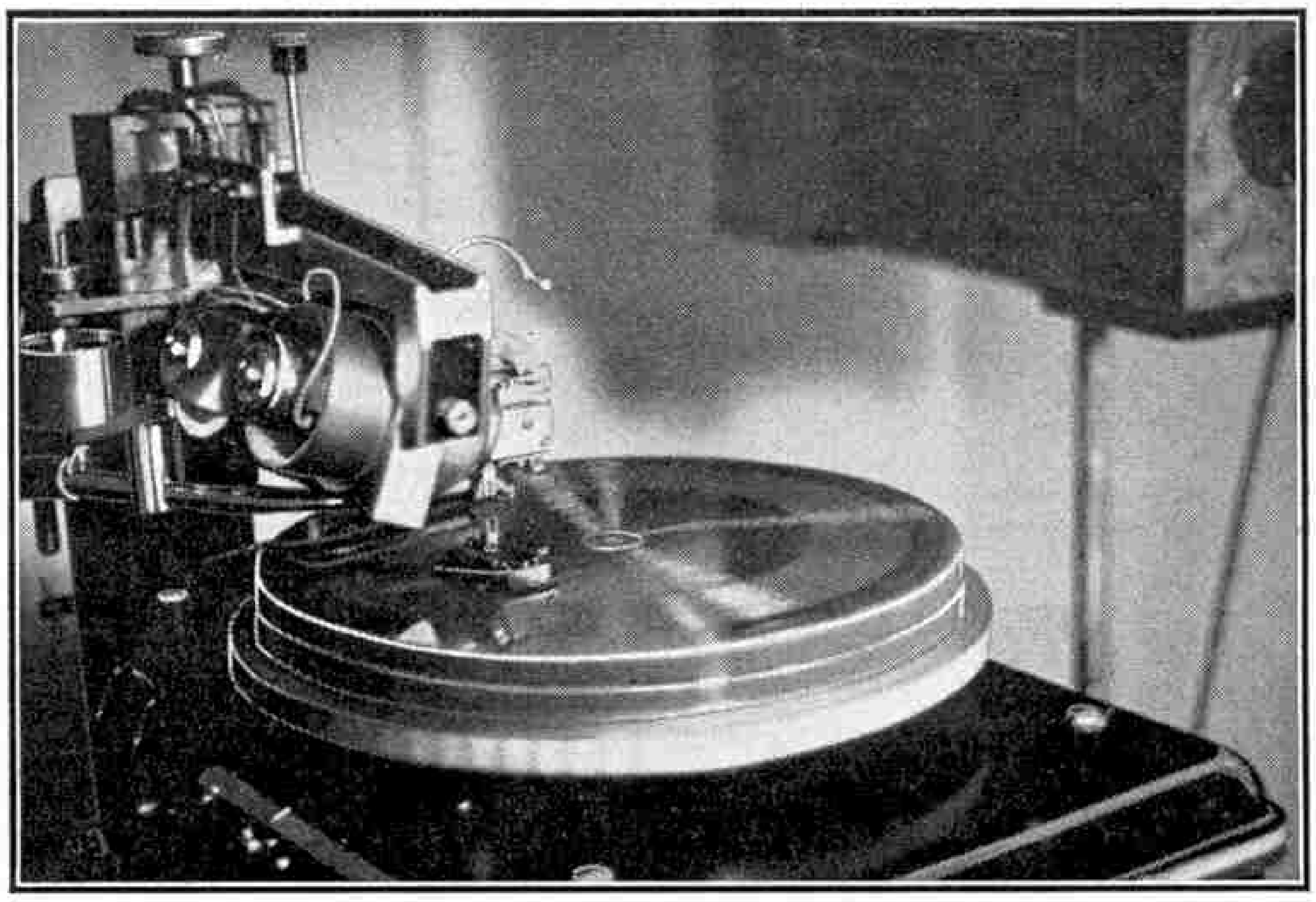
By A. G. Allen

VERY few people give any thought to the minor marvel of industrial efficiency represented by the latest double-sided gramophone record as they slip the delicate disc in their modern radiogram cabinet. The well-known trade mark "*His Master's Voice,*" with the dog "Nipper" wondering how his master could hide in the trumpet, perpetuates the old box gramophone with its single-sided record, surmounted by the overhanging loud speaker; but the production of records has made great strides since the date of the origin of the trade mark, all steps being effected in detail that can best be appreciated by those who are expert technicians.



A machine for polishing the tiny pieces of sapphire used as needles when recording. We are indebted to The Gramophone Company Ltd., Hayes, for the illustrations to this article.

In making a record in the studio a wax blank disc is first heated in a special stove and then placed on a recording table, where the grooves are cut by a minute piece of sapphire held in the recording head, a gravity motor providing the power to revolve the table. The sound of the performance is cut on the wax, the fine spiral of waste wax cut away by the sapphire being drawn off by suction.



Recording in progress. The threads cut from the wax disc by the sapphire are drawn off by a suction device.

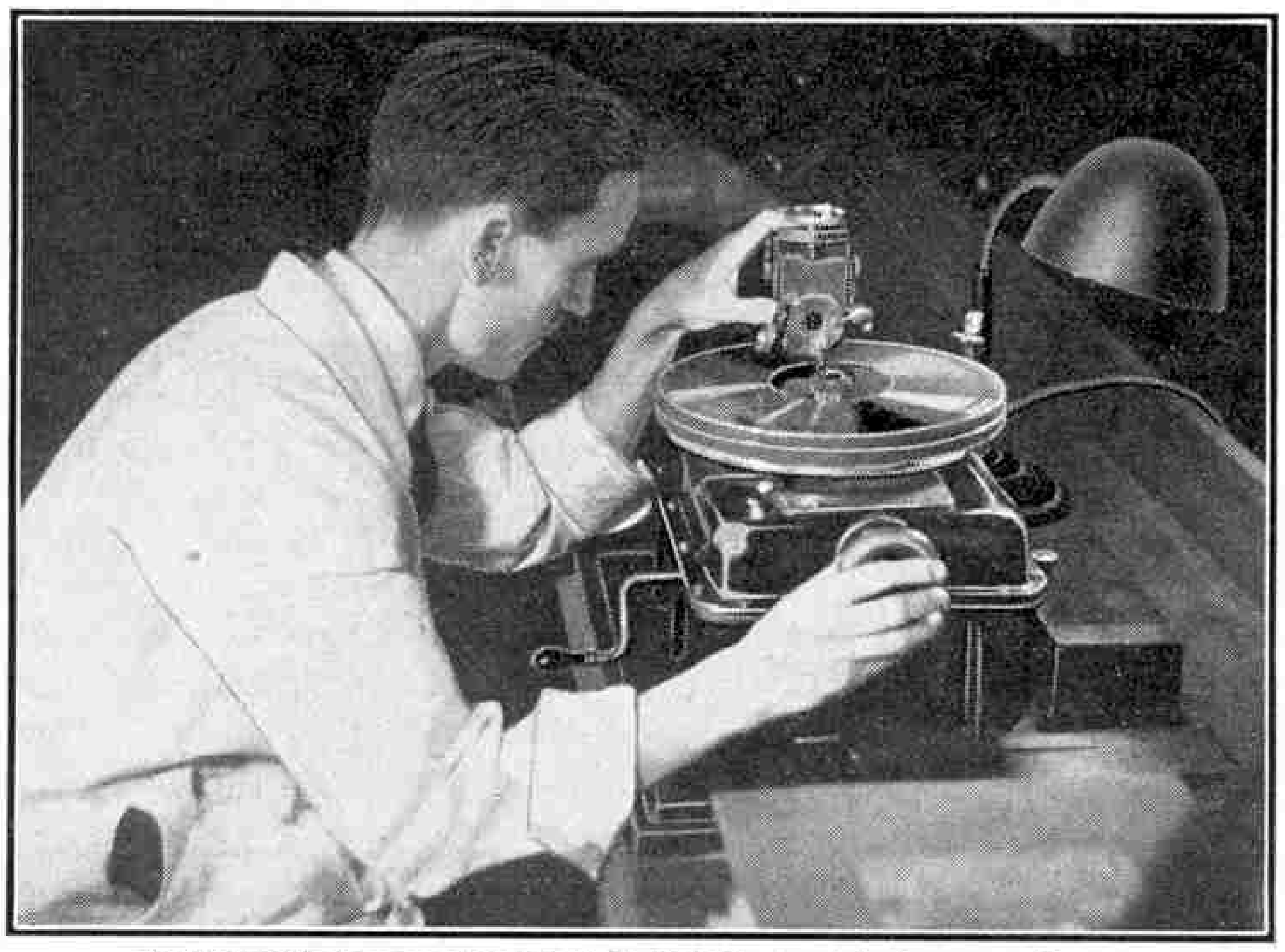
The recorded waxes are now conveyed in a specially heated van to the factory, where the disc is given a conducting surface absolutely without flaw. A copper-deposited disc called the "Master" is made from the original wax disc, and from the "Master" other deposited moulds termed "Mothers" are made. From these again further deposits are made. These are the "stampers," and when backed up with metal they go into the moulding presses for making the final wax playing "records" used on gramophones.

The original wax disc has a countersunk hole in the centre, in which a threaded metal peg is inserted to make contact for electrolysis. The surface of the disc is first coated with plumbago, and the disc is then fastened to a brass insulated stem by means of the threaded peg and nut. It is then swilled with methylated spirit, followed by clean water at a temperature of not less than 75 deg. and not more than 90 deg. F.

The disc is placed in an ebonite shell, and taken to a copper sulphate bath, which is agitated and warmed, and is provided with a cathode moving device. An extremely small current is necessary, and this should be adjustable to meet the requirements of the number of discs being plated. The discs are slowly revolved in this bath to obtain evenness of deposition. The copper deposit commences to grow from the centres, and it is essential that the first covering of the metal be smooth, as this is the vital surface for the ultimate result. If the copper is burnt a coarse grain is deposited that gives a distorted surface. The process of copper deposition takes from eight to ten hours, and when completed the copper is stripped from the wax, and the recording surface cleaned by means of a brush and a thick cream of lime mixed with cyanide. The surface is next well swilled, and the copper-deposited disc—the Master—then goes to the nickel-plating vat for 15 minutes. This bath is warmed, agitated and filtered, the temperature of the solution being 60-70 deg. F.

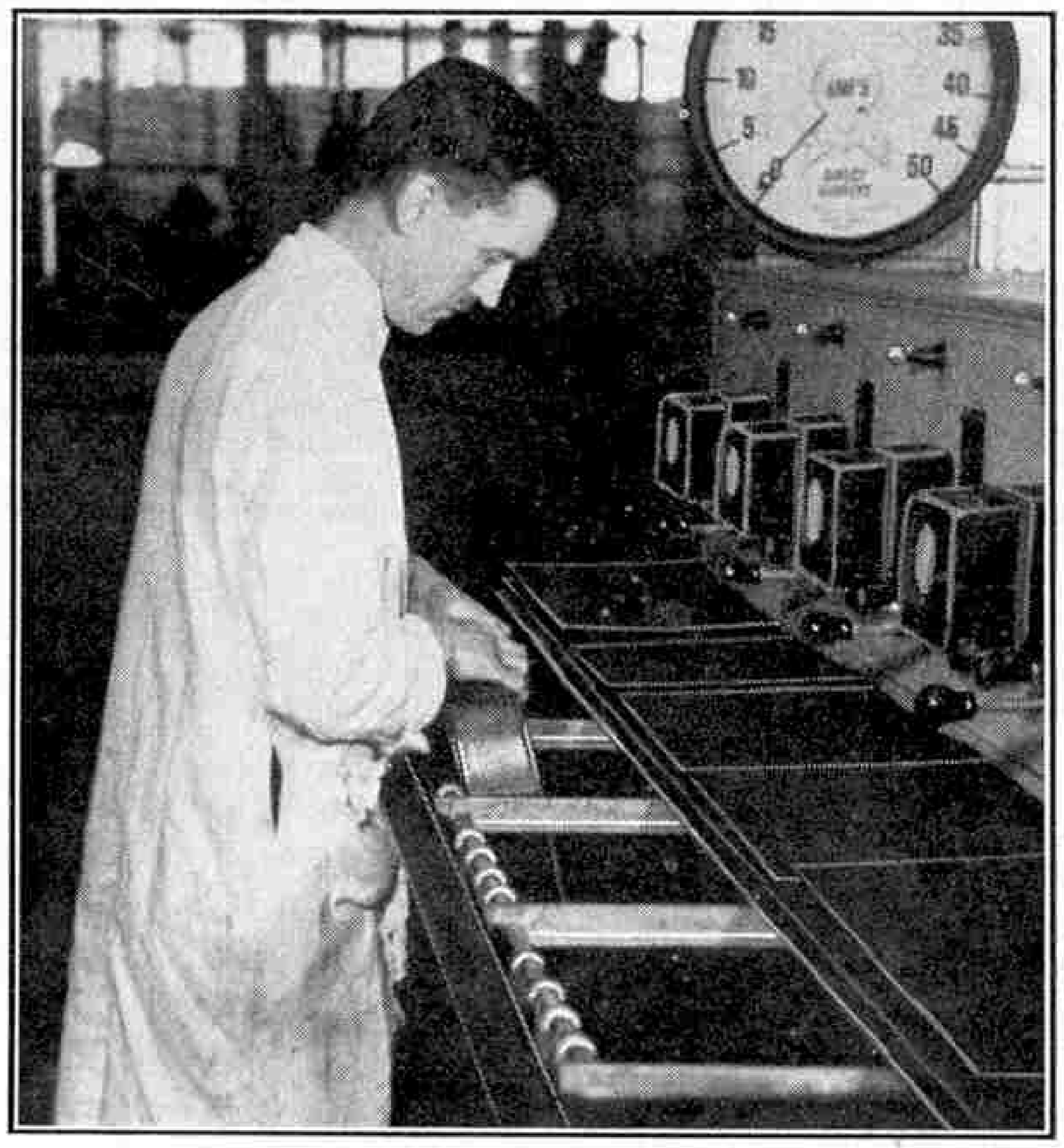
The Master is taken from the nickel bath, swilled in clean water, and dipped into a chromic acid dip containing two ounces of the acid to 10 gallons of water. It is next returned to the nickel bath for one hour and is then well swilled and mounted on an ebonite board with a rubber ring fastened around the edge of the disc for copper depositing. The rubber ring prevents the copper from "growing" on the edge of the disc and ensures an even deposit over the whole surface. The disc is left in the coppering bath for six to eight hours in general practice, but the operation can be accelerated in given circumstances, as the nature of this particular copper deposit is not so important as the thickness required for the shell. The disc is now removed, and the two deposits, Master and Mother, are stripped from each other, nickel stripping cleanly from nickel. The Mother is now ready to carry forward for making stampers.

The Mother disc is first scoured with lime and cyanide, well swilled, and then given a chromic acid dip as in the process of making the Master. It is then swilled, and put into the nickel bath for one hour. The nickel deposit must not be less than .001 in. thick, and must be entirely free from gas marks and grit. The importance of this will be judged by the fact that even a water mark on it would be reproduced.



Engraving the famous "His Master's Voice" eccentric groove on the wax.

After nickelling, the Mother is well swilled, given a chromic acid dip, and mounted on an ebonite board with a rubber ring, as was done with the Master. It is now coppered with a thickness of .025 in. The coppering operation must be done very carefully, as the texture of this deposit is all-important, and there must be no "pimples" on the copper face. A fine texture is ensured by the addition of a little more acid to the solution, and the latter must in any case be well filtered to ensure freedom from dirt and grit.



A container holding a wax disc being placed in an electrolytic bath, in which it is slowly revolved during plating operations.

The two deposits are now stripped, and we have the stamper. The nickel face of the latter is polished by means of a lime paste and petrol applied with a soft rag, the stamper being revolved in a chuck to assist in making the polishing thorough.

The stamper is finally reversed in the chuck, and trimmed down to the correct size. The least sign of "pimple" or growth on the copper deposit must be cleared, as if left it would be pressed into the deposit when the stamper is placed in the moulding press, to which it is next sent, and this of course would spoil the face of the playing record.

Occasionally a specially hard face is required for a stamper and for this purpose a "hard" chromium solution is used. This is made of special chromium salts in the proportion of 42 ounces to the gallon of water. Stampers destined for the chromium bath are cleaned, swilled and dried in the usual way prior to this process.

The vat must be of welded iron lined with 8 per cent. antimonial lead and again glass lined. It is essential that it is thoroughly clean. The vat is half filled with clean water and the salts added slowly to it, stirring well the whole time. The solution is then gradually brought up to the boiling point and allowed to remain there for one hour, and when it has cooled to 110 deg. F. water is added until the correct density is reached. A slight sediment at the bottom of the vat is ignored.

The temperature of the solution must be maintained as near as possible to 110 deg. F. If it falls below this the deposit will lose its hardness, whereas no useful purpose is served by having the temperature over 110 deg. F.

Lead anodes of the same area as the stampers to be chromium-faced must be used, and they are hung 5 in. away from the stampers. Stampers are hung in the chromium solution with the current on the vat.

The current employed when working is 250 amp. per sq. ft. of surface. The voltage necessary with a cathode distance of 5 to 6 in. is 5 to 6 according to the quantity of stampers being plated. The stampers are held with clips sufficiently large to carry the current, and are suspended from the cathode rod by means of hooks or copper rods. The clips must not shadow the face of the stampers, and they should preferably make contact from the back. The stampers must gas vigorously when in suspension in the solution, and increased voltage may be necessary to accomplish this. The work may be inspected during deposition, but if this is necessary, the stamper must afterwards be swilled in warm water at 110 deg. F. Cold water must not be used, or the brightness of the face will be lost.

After the stamper has been removed from the chromium solution, it is swilled in the same hot water swill and then in clean cold running water. It is next put through a hot solution of washing soda containing 1 lb. to the gallon.

The metal deposited from the solution must be replaced. This is best accomplished by the addition of $\frac{1}{4}$ oz. of chromic acid per gallon of solution daily. Hard chrome salts should be added weekly at the rate of half an ounce to the gallon of solution, to make good the loss of solution adhering to the work.

The completed "record" is carefully inspected and tried out by experts listening to its performance before issue to the trade. The slightest flaw in appearance condemns the disc.

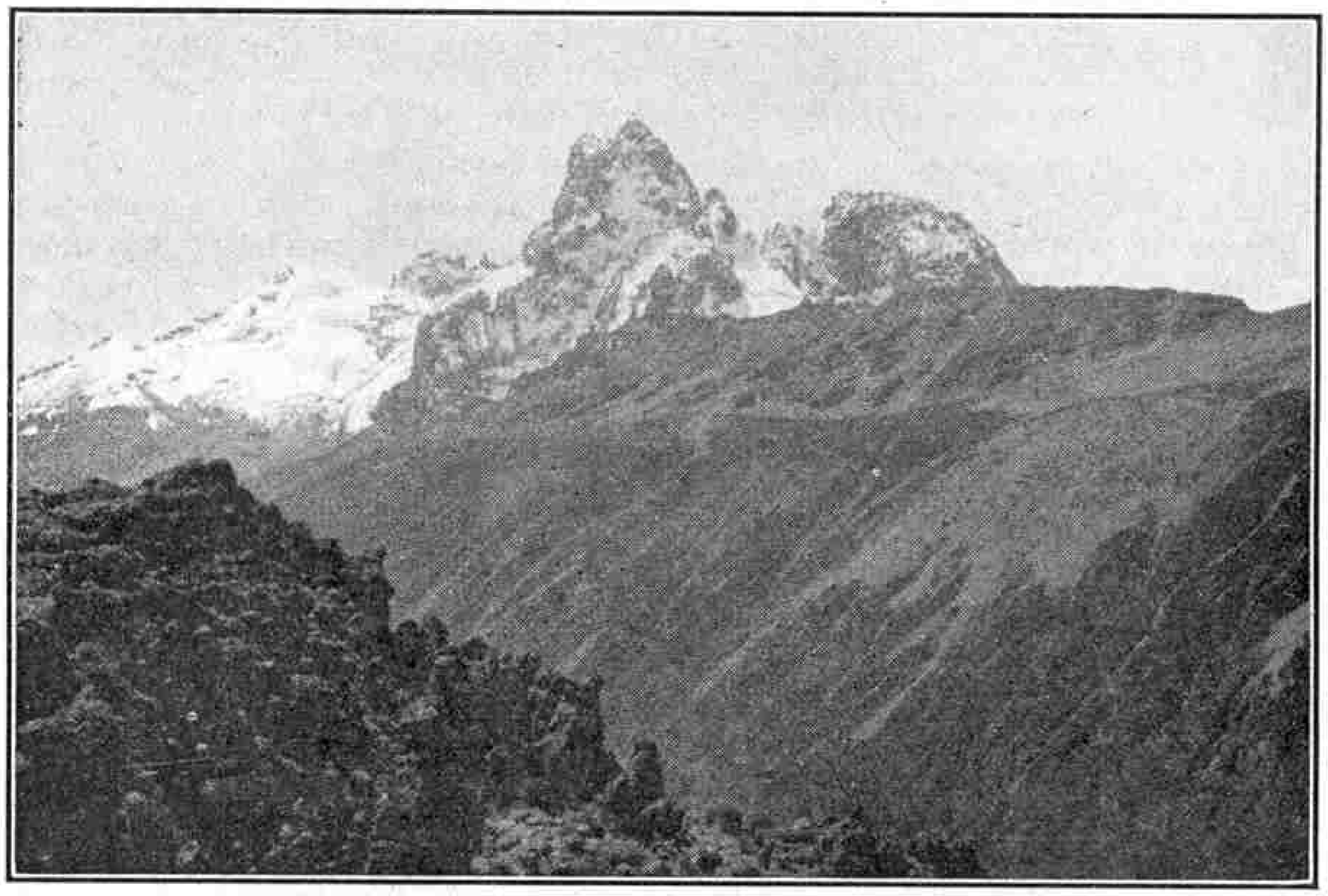
Amateurs on Mount Kenya

Snow and Ice on the Equator

By B. A. Soltau

MOST people who live on the foothills of a great mountain have a vague desire to climb it one day. I know I have, and I had not been in Kenya long before the sight of the snow-clad peaks of Mt. Kenya towering away in the clouds seemed to issue a challenge that I could not refuse. I found three friends obsessed with the same idea, and we arranged to start one day early in January, when the weather is most suitable.

Our preparations were scanty. We collected enough food for a week, with a weird assortment of pots and pans in which to cook it, and got together the few warm clothes we possessed, quite an imposing collection considering that we lived on the Equator. Proper mountaineering equipment was out of the question. Apart from the difficulty of obtaining it, it would have been more of a hindrance than a help, for none of us had done any real climbing. An obliging gentleman in the neighbourhood hired us natives and ponies, both of which had been a certain distance up the mountain many times and were used to the altitude. He also gave us some idea of the route we should take, and sent us on our way with many injunctions as to the necessity of going slowly, and the dangers of mountain sickness.



The three peaks of Mount Kenya. The two main peaks are on the right, and Point Lenana, the one climbed by the author, is on the left. The highest point of the mountain is at a height of 17,040 ft.

Mt. Kenya is just over 17,000 ft. high, but we were starting from nearly 5,000 ft. above sea-level, which made it sound easier. We must have been quite an imposing cavalcade as we set off. We were mounted on Somali ponies, surefooted little beasts that carried us well, and beside us walked or ran our two guides. Behind came five pack ponies carrying our luggage, tents and provisions; the rest of the natives, including the cook and camp-followers in a motley throng; two mules and a donkey, the last with a sack of potatoes bouncing about on its flanks.

At first the going was fairly level, and we cantered along through the bush country that we knew so well, pausing now and then to allow the rest of the cortege to come up to us, and to look up at the bulk of the mountain hanging over us. Gradually we started to climb; the bushes became small trees, the canter deteriorated into an uncomfortable trot, and the country began to spread out behind and beneath us. By lunch time we had reached the fringe of the forest and the first official camp, a small clearing among the giant cedars, which was known to the natives as *campi ya nyama,* the camp of the animals. Here we had a small meal, looking round rather apprehensively for the animals, which evidently were taking their siestas, for they did not show up. Now the first contretemps arose—the donkey could go no further. Why he had come so far was a mystery that the natives did not deign to explain. Reluctantly we redistributed a third of our potatoes and abandoned the rest.

All afternoon we climbed steadily up through the forest, winding among the vast cedars through leafy glades where grew wild gladioli and many unknown flowers. Once the eerie quiet was disturbed as a rhinoceros crashed off through the undergrowth at our approach, and another time, on looking down from the ridge we were on, we saw a herd of elephant feeding below us. But on the whole our passage was curiously uneventful. We were always expecting something to happen, but it never did; the monotonous chatter of the natives somewhere behind us on the path was the only sound that came to our ears.

After two hours the cedars began to give way to bamboo, and soon we were in a thick impenetrable mass of these trees, through which the light could scarcely filter. The path that originally must have been cut was rapidly becoming overgrown again, and the natives went ahead, snapping the brittle branches to clear our way. Luckily this belt of bamboo was short, and we came out again into fairly open country, with small trees and bushes and wide clearings covered with long grass.

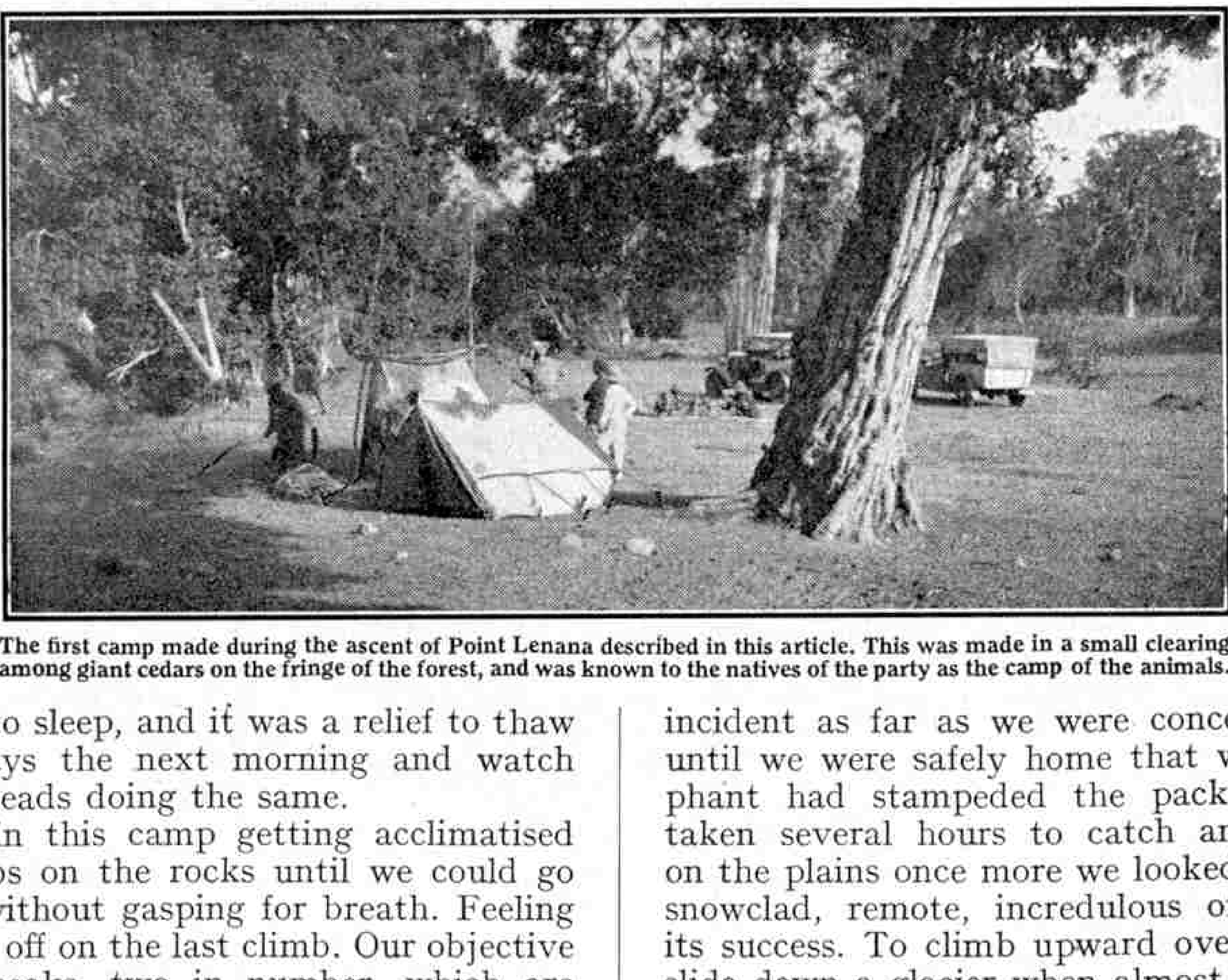
Here was the next camp and our resting place for the night, in a little clearing dominated by a large tree. We climbed down stiffly from our ponies and supervised the building of a fire and the putting up of our tents. As the Sun went down the air became extremely cold, and we realised for the first time how high we had climbed. It was a strange experience after months in a tropical climate to be able to see the breath we exhaled, to huddle round a fire for warmth while we ate our meal and to creep into a bed piled up with all available clothing.

Soon after we set out the next morning the scenery changed completely. The trees and small bushes, which had been getting fewer, vanished completely, and we came out into open moorland, with heather growing in profusion and many English wild flowers. At last we could look around and see the world spread out beneath us and the snowy peaks above, nearer than before but still a long way off.

Another view of Point Lenana. On the left in the foreground is a slope on which is growing giant groundsel, a weird plant with a thick trunk and a bushy top, which grows in grotesque shapes.

As we progressed up the moor and the slopes became steeper our ponies began to feel the altitude and panted for breath as they laboured along. The last and steepest slope was too much for them, and we got off their backs and hung on to their tails for support as they scrambled along. We were now enveloped in wisps of cloud from time to time, the air was chilly and our lungs began to feel the need of oxygen. A final steep descent into a valley brought us to our next camp, dignified with the name of cave but in reality a rocky ledge beneath a cliff face that gave some slight protection from the icy wind blowing off the snow.

We were now some 14,000 ft. up, and there was practically no vegetation except coarse grass and the giant groundsel, a weird plant with a thick trunk and a bushy top, which grows in grotesque shapes. This was the only material for firewood, and although it burnt fairly well it gave out an acrid smoke that was most unpleasant. As night came on the cold became intense, and we felt very sorry for the natives in their meagre garments. They did their best to persuade us to return the next day, assuring us that most *bwanas* went no farther than this, and that it was *baridi sana*, extremely cold, higher up.



The first camp made during the ascent of Point Lenana described in this article. This was made in a small clearing among giant cedars on the fringe of the forest, and was known to the natives of the party as the camp of the animals.

That night, owing to the very heavy dew, we slept on our tents instead of under them, the four of us huddled together, with clothes and blankets piled on top. Even so it was almost too cold to sleep, and it was a relief to thaw out in the Sun's rays the next morning and watch the icicles over our heads doing the same.

We spent a day in this camp getting acclimatised by doing short climbs on the rocks until we could go at least fifty yards without gasping for breath. Feeling much stronger we set off on the last climb. Our objective was not the main peaks, two in number, which are only for mountaineers, but the third highest, known as Point Lenana, on which lies the Lewis glacier. For four hours our path lay over loose shale slopes as we wound round the mountain in a circuitous route. At each step forward we slipped back several inches and every few minutes we had to stop to regain our breath. Our guides outdistanced us easily, and from time to time would stop and wait for us with a supercilious expression on their faces, much to our discomfort!

At last we came to the snowline and the foot of the Lewis glacier, marked by a frozen lake and a small hut. After a short rest we started gingerly to climb up over the frozen snow, much to the disgust of the guides, who were hampered by their bare feet and our cameras slung around their necks. Afterwards we were told that we were the first people to climb this glacier without proper clothing and equipment, but at the time it did not seem much of an achievement, except for the last few hundred feet, where the slope became almost perpendicular and we had to kick out each step before moving on. The view from the top, and the realisation that we had got there in spite of the guides' gloomy forebodings, were ample reward for our efforts.

The descent was not without humour. We simply sat and allowed ourselves to slide down over the frozen surface, keeping a sharp lookout for crevasses. A most exhilarating method of progress! Our guides were nonplussed and followed a long way behind, picking their way gingerly along on two feet and a stick. We more than overcame the sense of superiority they had gained on the way up, and the faces of their companions in the camp when we returned before them were delightful to behold.

Our ride back down the mountain was without incident as far as we were concerned, for it was not until we were safely home that we learnt that an elephant had stampeded the pack ponies, and it had taken several hours to catch and quiet them. Back on the plains once more we looked up at Point Lenana, snowclad, remote, incredulous of our adventure and its success. To climb upward over frozen snow and to slide down a glacier when almost on the Equator is an experience that is given to comparatively few people, and we shall long remember our climb of one of Mount Kenya's peaks.

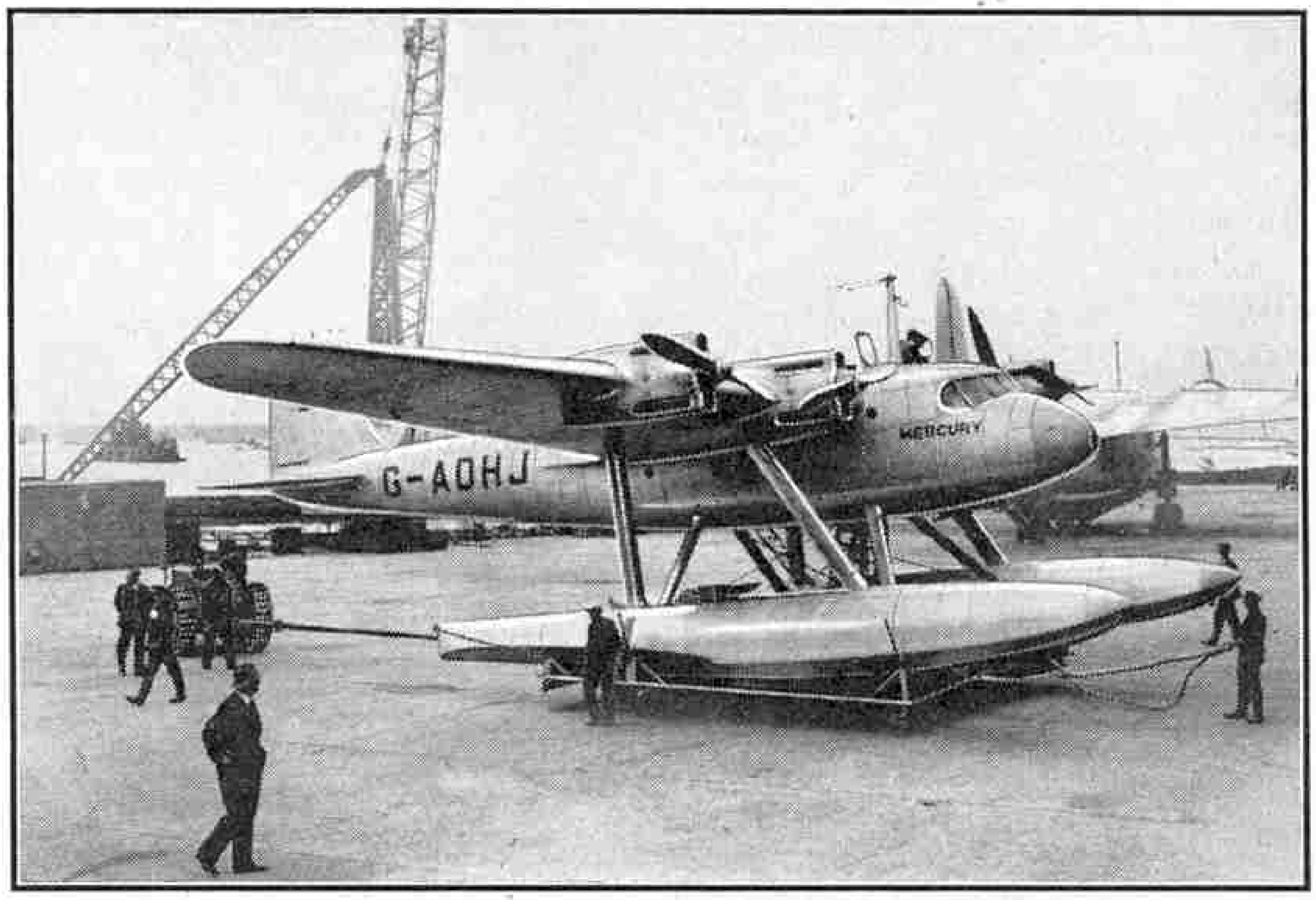
AIR NEWS

Testing the Giant Boeing Flying Boat

The recently completed four-engined Boeing flying boat, the largest aircraft of its type built in the United States, is now undergoing a series of tests described by the company as the most rigorous and thorough ever planned for a new transport aircraft. The preliminary tests have been completed, and their success indicates that the performance of the aircraft will be even better than was originally anticipated. They included 250 miles of surface taxi-ing, several take-off runs, flying, and countless stationary tests. Taxi-ing tests throughout the entire range of speeds indicated that the hull lines of the big aircraft are ideal, and the four 1,500 h.p. engines were cooled perfectly during the severest type of cooling test, in 16 miles of slow taxi-ing down-wind.

In the second phase of the tests, recently begun, the crew will put the flying boat through all types of manœuvres in conditions much more severe than will be encountered in normal trans-oceanic service. For instance, in order to test the controllability of the aircraft under all conditions they will manœuvre her on the water into the extreme banked positions, with the watertight wing tips at the water's surface, tack into stiff winds at various angles, and "rock the boat" from side to side; just as a new model of a motor car is driven rough and tumble over severe testing grounds to ensure its safety on the road. The trials will include thorough tests of rudder control with new rudder surfaces designed to improve still further the water-handling characteristics of the aircraft, as twin rudders have replaced the original single large central rudder. They are designed to function directly in the slipstream of the airscrews, and thus provide maximum rudder control for manœuvring the flying boat on the water. It is also intended to make tests with a central stationary fin, as a possible addition to the tail unit.

This exhaustive testing is in preparation for the official trials for the Department of Commerce. Most of the official tests will be made with the aircraft in flight, and they will include hundreds of items, ranging from altitude climbs to night flying.



"Mercury," the upper component of the Mayo Composite aircraft, being towed by a Ruston Roadless tractor at Southampton, prior to the record Atlantic flight last July.

Pilot's Wonderful Flying Record

Capt. F. Dismore, one of the veteran pilots of Imperial Airways has recently completed 25 years as an aeroplane pilot. This is considered to be unique as a record of sheer continuous flying in all types of aircraft from the earliest days of aviation to the present time.

It was as far back as August 1913 that Capt. Dismore gained his certificate of proficiency as an aeroplane pilot. He was at the famous Central Flying School, Upavon, in the pioneer days before there was any special flying corps uniform. The soldiers, sailors, and marines who were drafted to the School wore so many different uniforms, including kilts, that Upavon was referred to jokingly as "the Zoo."

In the early days of the Great War, Dismore carried out scouting flights over the North Sea in search of enemy submarines, and later he saw much active service, fighting against enemy aircraft in Belgium. He also acted as a flying instructor. When hostilities ceased and civil aviation began to develop, Dismore flew on the first commercial air services to the Continent, and he has been an air-liner Captain ever since, having now flown a total distance of about 1,250,000 miles.

Fast Monoplanes on Air France Routes

Air France are now employing their new Marcel Bloch 220 monoplanes on services from London to Paris, Zurich, Marseilles, Stockholm, and Amsterdam. These 220 m.p.h. 16-seater air liners are also to be introduced on the company's London-Paris-Prague-Bucharest service. They are notable for the quietness of the passenger cabins.

R.A.F. Vacancies for Apprentice Clerks

In order to meet increased requirements under the new R.A.F. recruiting programme, a substantial number of boys of School Certificate or approximately equivalent educational standard will be required this month to fill vacancies for Apprentice Clerks. These vacancies offer excellent opportunities for a Service career to boys from Secondary, Central, Junior Technical and other schools who have no inclination towards a mechanical trade, but are attracted to Service life and desire to travel abroad.

Candidates must be between 15½ and 17½ years of age on 1st October, and those who are successful will undergo a thorough course of training in clerical duties during their first 18 months' service. They will be attested for 12 years' regular Air Force service from the age of 18 years. The work on which Service Clerks are employed is varied, and includes administrative duties, shorthand, and in some cases accounting for pay and equipment. They are usually required to spend part of their Service life overseas.

A limited number will be permitted to re-engage to complete 24 years' service and so qualify for an R.A.F. pension. Those who return to civil life after completing only the first period of 12 years' service will be given an opportunity of entering the R.A.F. Reserve and of drawing a gratuity of £100.

All Apprentice Clerks have an opportunity to volunteer for training as airman pilots, and those who are selected become Sergeant Pilots when they have completed their training, and are employed on flying duties for six years. Airmen Pilots who are specially qualified may be recommended for permanent commissions in the General Duties Branch, and a limited number of permanent commissions may also be granted in the Accountancy and Equipment Branches to ex-apprentice clerks.

The conditions of entry are given in A.M. Pamphlet 9, a copy of which may be had upon application from The Inspector of Recruiting, Royal Air Force, Victory House, Kingsway, London W.C.2.

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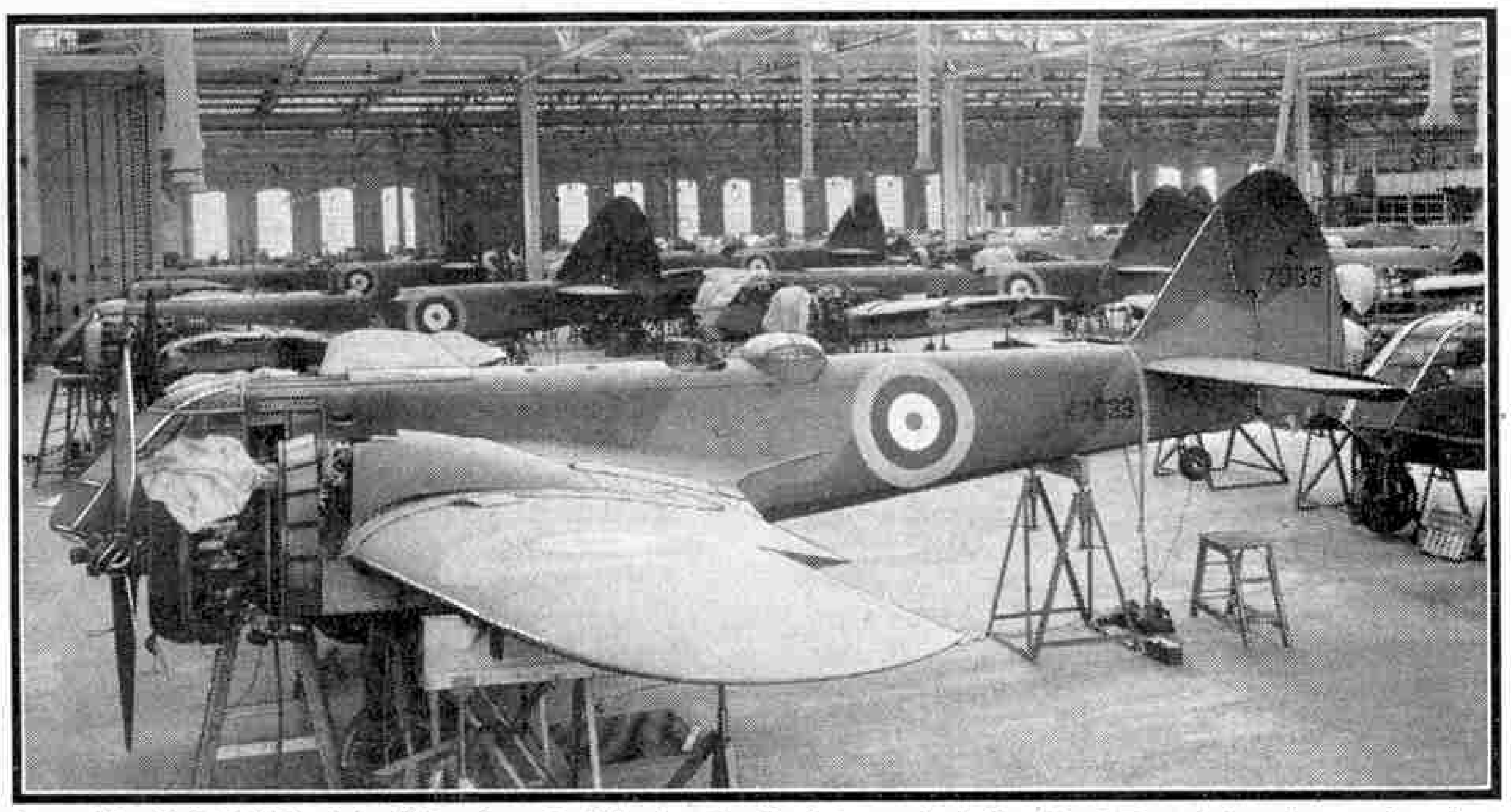
According to an Air Ministry Bulletin there are 10,836 registered civil aircraft in the United States, 2,769 in France and 1,656 in Great Britain. In Canada there are 578, in Italy 564 and in Australia 323.

An Airway Direction Post

An unusual "finger-post," believed to be the first of its particular kind, has recently been erected by Imperial Airways at the aerodrome at Karachi.

It is of special interest, for it shows in a very effective manner how aeroplane travel has made the world smaller, and has familiarised us with distances that would have been considered vast only a few years ago.

In its general form the post is practically identical with those that tell every traveller on the road the distance to the nearest village, or the next town, a mile or two away. Placed where it is, at the focal point of three great airway routes, it serves another and rather more interesting purpose, making every passenger who sees it realise how the air liner now links up the ends of the Earth.



Assembling Bristol "Blenheim" Bombers. In this view the final stages, including the fitting of the wings and engines, are shown in progress. Photograph by courtesy of The Bristol Aeroplane Co. Ltd.

A neat detail is the fitting of the Imperial Airways "bird" symbol at the top of the post, at the point where the local authority plate is usually fitted on road posts, thus showing that airways cover all distances and span all boundaries.

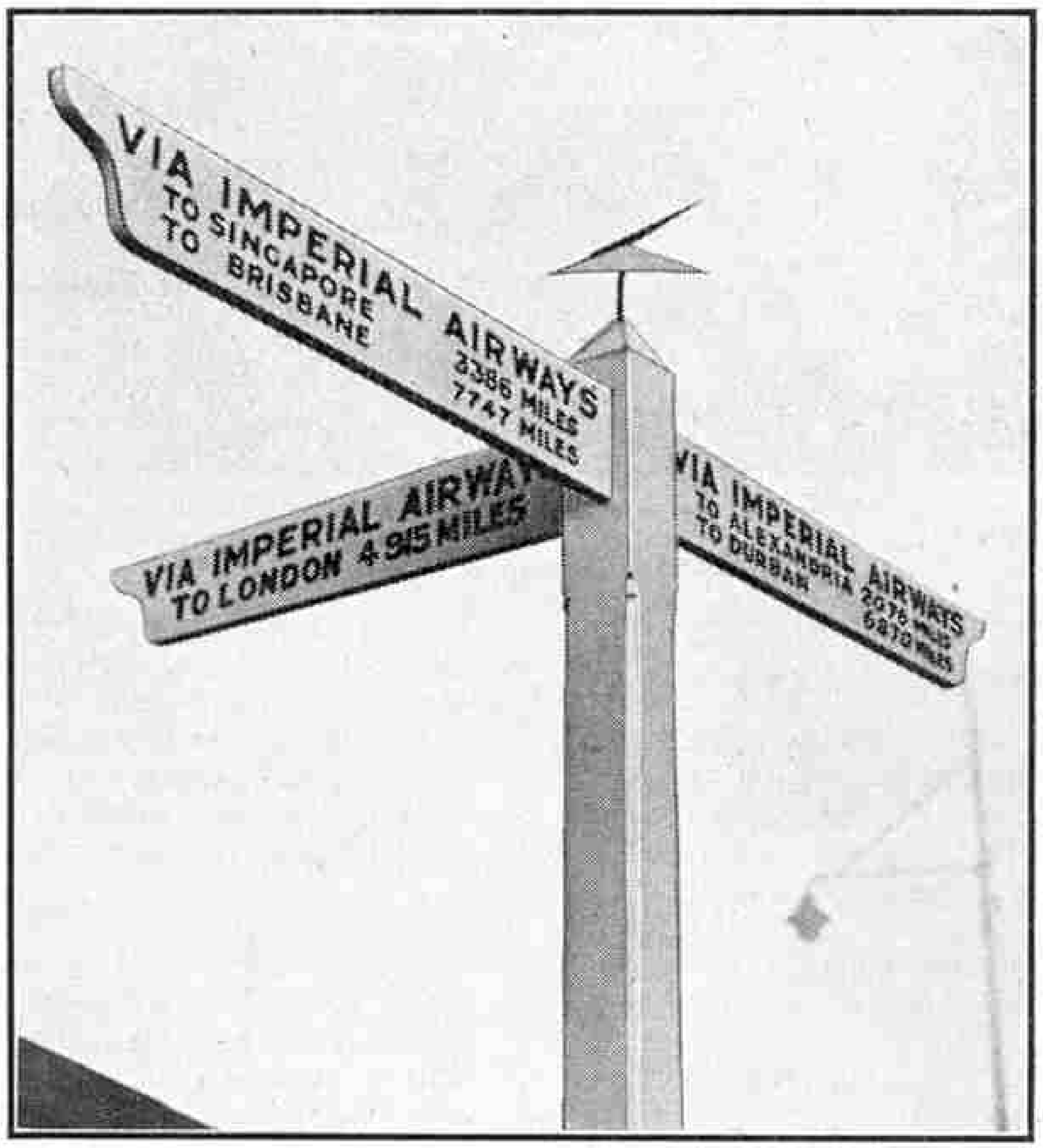
Propeller Driven by Two Aero Engines

In America a new type of engine installation for aircraft, called "Unitwin Power," has been developed jointly by the Lockheed Aircraft Corporation and the Menasco Company, as the result of two years of efforts to combine the safety features of twin aero engines with the simplicity of single engine installations. It consists of two complete and separate in-line engines coupled together side by side, and driving a single airscrew through reduction gearing and over-riding clutches. Either engine can be put out of gear if it develops a fault, leaving the other one free to operate independently and maintain the aeroplane in flight.

Flight tests of the new engine unit fitted in a monoplane built by the Vega Airplane Company, a subsidiary of the Lockheed Aircraft Corporation, have been very successful. Repeated take-offs and landings were made in order to use the maximum range of power over short intervals, and the two engines easily produced their maximum 580 h.p. without any strain on the gearing device or clutch.

Air Ticket Nearly Seven Feet Long

The longest air travel ticket ever issued by Imperial Airways was handed over recently to Mr. A. W. Lang, an Air Ministry official. It was 6 ft. 8 in. long and covered three months of intermittent air travel. Mr. Lang has gone by Empire flying boat to Lourenço Marques, in South Africa, to carry out a survey for his department. He will then set off back to London by air, and will call at each alighting area on the way. Each of these calls has added four inches to his ticket, which comprises 20 sections.



This novel "finger post," erected by Imperial Airways at the aerodrome at Karachi, shows how air transport has familiarised us with distances that would have been considered vast a few years ago.

An Indian Air Mystery!

An amazing rumour spread recently among natives near Lake Dugari, situated between Raj Samand and Gwalior, on the trans-Indian air route, to the effect that a huge "white bird" had come to rest upon the surface of the lake. Natives swarmed to the spot, and there, sure enough, floated this "apparition." Actually it was the Empire flying-boat *"Ceres,"* which had made an intermediate landing on the lake owing to exceptionally bad weather, and as the water in the lake was unusually low at the time the Captain had to have his aircraft towed into deeper water.

The passengers and mails were disembarked and conveyed to Gwalior, where they boarded a relief flying boat. In the meantime *"Ceres"* had to await suitable conditions of wind and weather before ascending again, and while the flying boat was on the lake something like a general holiday was proclaimed in the district.

"Showing the Flag" along the Empire Air Routes

Each Empire flying boat that ascends from the Southampton airport for a flight across the Empire has on board as many as 52 different flags. They are stored in the control cabin, and include the Civil Air Ensign, the Royal Mail pennant indicating that the aircraft is carrying His Majesty's mails, and the flags of France, Italy, Portugal, Greece, Egypt, Union of South Africa, Siam, Persia, Iraq, and Bahrein. The Civil Air Ensign and the Royal Mail pennant, together with the flag of the country in whose waters the flying boat has alighted, are flown above the hull during the time the aircraft is riding at its moorings. The only other time when the Civil Air Ensign is called into use is when the flying boats, in the course of their air voyages above Africa, India, the Far East, or Australia, pass each other 100 miles or more out from their last airport. It is then a matter of courtesy for them to salute each other by running up their Civil Air Ensigns.

Each Empire flying boat also carries 36 international code flags, a pennant, and three substitute flags. The international code flags come into use when the flying boats are manœuvring among shipping, on the surface of the water. Flags are not flown between sunset and sunrise.

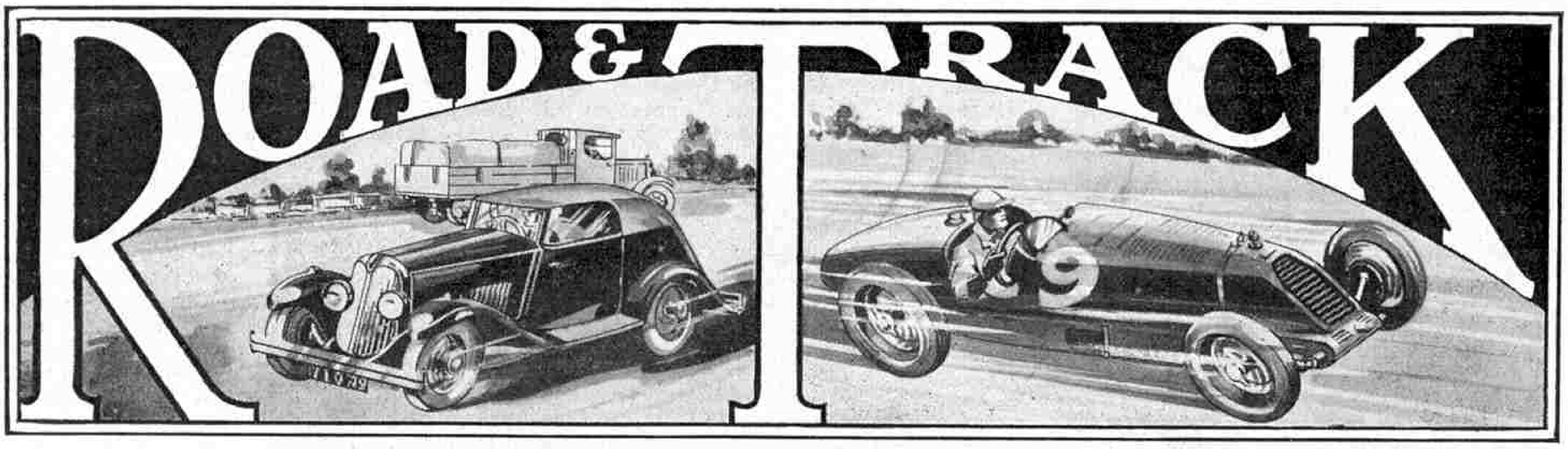
Blue Air Mail Letter Boxes to Go

The decision to remove from the streets of London and provincial cities the familiar blue air mail letter boxes, marks another stage in the development of air communication. These boxes first made their appearance in 1930, when air mail was a high-speed facility outside the scheme of ordinary postal dispatch, and they were introduced to facilitate the handling of special stamped and labelled correspondence intended for transport by air.

To-day the dispatch of air mail no longer involves special fees and labels, but is a normal, every-day means of speedily transporting first class mails. The need of special air mail letter boxes therefore no longer exists.

New Zealand Orders British Military Aircraft

The New Zealand Air Force is to be greatly enlarged and by 1940 will total 900 officers and men. The construction of additional Air Force stations is being put in hand, and the aircraft and other equipment are to be increased. The New Zealand Government have ordered 30 Vickers "Wellington" bombers at a cost, including equipment, of £750,000, and these aircraft will be flown to New Zealand as soon as the stations there are ready to receive them. The Government have ordered five Airspeed "Oxfords" for the training of pilots and other work.



ROAD & TRACK

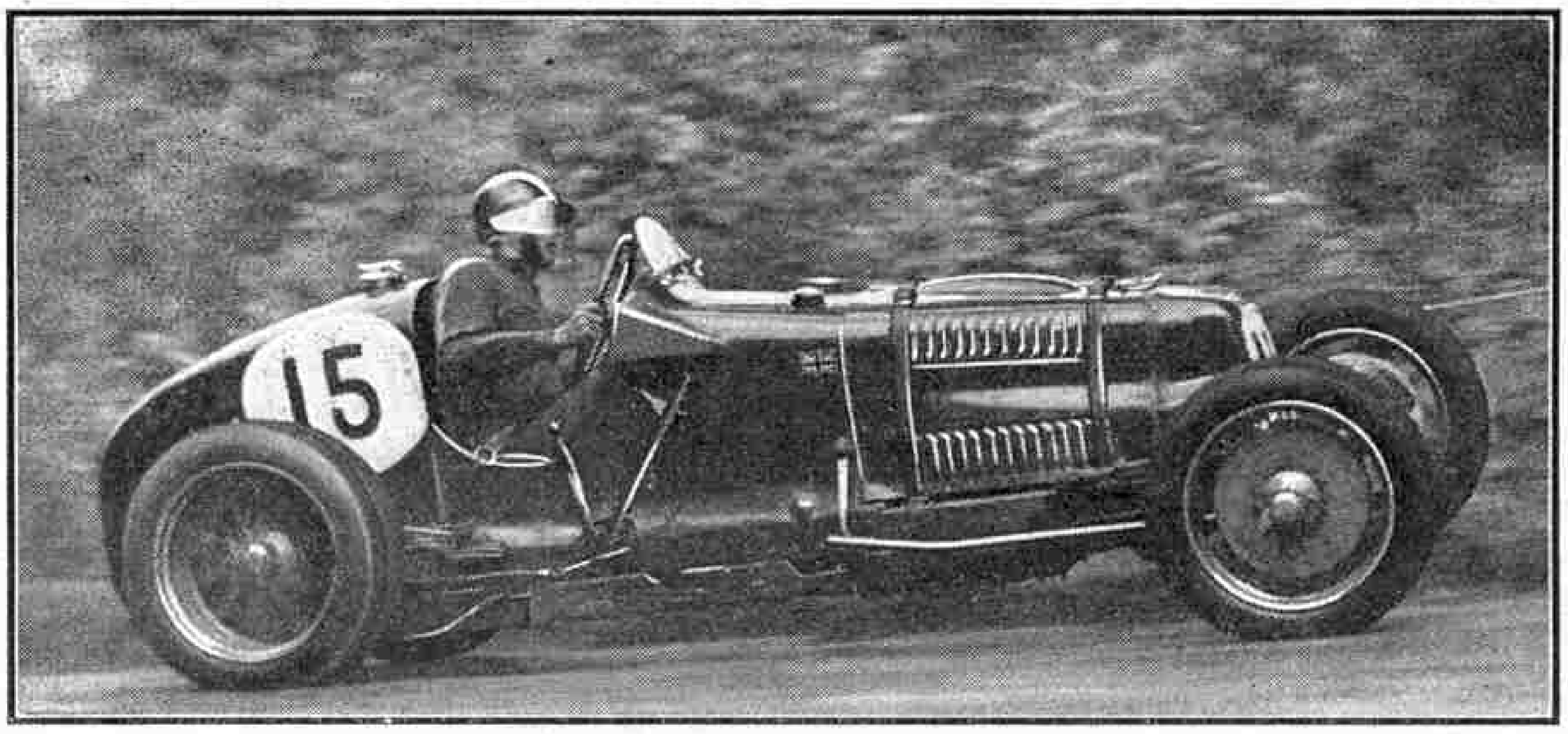
Semi-Sports Car's Fine Achievement at Donington Park

The outstanding feature of this year's R.A.C. Tourist Trophy Race, which was run over the Donington Park Course, was the remarkable performance of a semi-sports Aston Martin driven by St. John Horsfall, who obtained second place. The only competitor to beat him among the 31 British, French, German and Italian drivers in the race was Louis Gerard, whose huge blue Delage completed the course at an average speed of 67.61 m.p.h. The average speed of the Aston Martin was 65.45 m.p.h., and as it was considerably less powerful than the big Continental cars entered for the race, its great run was a very fine achievement.

Rain fell heavily at one stage of the race, and on several occasions speeding cars skidded round and round at the acute corners. On one occasion Gerard, who had thrilled spectators with his fine driving, skidded wildly in descending a slope, after which his car spun round four times and finished up broadside across the road.

The cars were grouped into five classes according to the capacities of their engines, and in each class a prize of £200 was awarded. The winners of these were: Class 1: Etancelin (Darracq); Class 2: Gerard (Delage); Class 3: Horsfall (Aston Martin); Class 4: Gee (Riley); Class 5: J. Breillet (Simca-Fiat).

The Tourist Trophy is a separate award presented to the competitor finishing first under handicap based on the above classes.



A. F. P. Fane at the wheel of his single-seater Frazer-Nash during his record-making run at last year's Shelsley Walsh Hill Climb. Although the engine is rated at only 11.9 h.p. the car is capable of nearly 145 m.p.h. on the track. Photograph by courtesy of A.F.N. Ltd., Isleworth.

British Drivers' Successes in Continental Races

Motor racing history was made, and the prestige of British drivers was considerably enhanced on the Continent, by the fine achievement of Richard Seaman in winning the German Grand Prix, which is generally regarded as the greatest Grand Prix event of the year. The last British driver to win a classic Continental race of this kind was the late Sir Henry Segrave, about 15 years ago, although there have been several British victories in minor events. Seaman was the fourth driver of the Mercedes-Benz team, and his average speed was 80.55 m.p.h.

The race was one of the most thrilling seen this season. One incident that might have had a disastrous ending occurred when Seaman's Mercedes and another machine of similar make driven by Brauchitsch, ran into the pits for fuel and tyres simultaneously. In the hurry to re-fuel and get the cars away again, the tank of Brauchitsch's machine was overfilled. On starting up a back-fire ignited a pool of petrol all around the driver, who struggled frantically to escape from the cockpit and was dragged free by one of his crew while fierce flames flared high into the air. A large portable extinguisher was brought into action and eventually the blaze was smothered. Brauchitsch immediately leaped into the driving seat, and was greatly relieved to find the engine still in running order. Instantly he started off down the course in pursuit of Seaman, who meanwhile had refilled and set off again. The German's misfortunes were not yet over, however, for he had only gone a short distance, when he crashed badly and had to retire, leaving Seaman to travel on to victory.

Another noteworthy British success on the Continent this season was that of J. H. White, who rode his 350 c.c. Norton to victory in the German Motor Cycling Grand Prix. White covered the course of 214 miles at an average speed of approximately 74.8 m.p h. in the record time of 2 hr. 40 min. 48.2 sec. E. A. Mellors, another British rider, was fourth on a Velocette.

British machines and riders also did well in the 500 c.c. event, H. L. Daniell (Norton) and F. L. Frith (Norton) obtaining second and third places respectively. Daniell's average speed was 85.4 m.p.h. and Frith's 84.8 m.p.h.

Artificial Weather Tunnel for Testing Cars

A giant "weather" tunnel, which is the first of its kind ever built solely for scientific research in motor car design, is now in operation at the Ford Motor Company's Engineering Laboratory, Dearborn, Michigan, U.S.A. It is used in conjunction with three new motor car test tracks in the research work carried on by the Company's engineers, and enables motor cars of new design to be tested in all weather conditions before they are put on the road.

The tunnel is equipped to produce every conceivable kind of weather, thus enabling tests to be conducted regardless of conditions outside.

One of the three test tracks is made of concrete and is 2⅝ miles in length, with banked turns to allow tests to be carried out at high speed. Another track has a surface of gravel, and the third is designed to give various "rough road" effects.

The engineers had to rely entirely on actual road tests before the tunnel and tracks were available. This meant that test cars had to be sent all over the country and often had to wait for long periods for appropriate weather before certain tests could be completed.

England's Widest Road

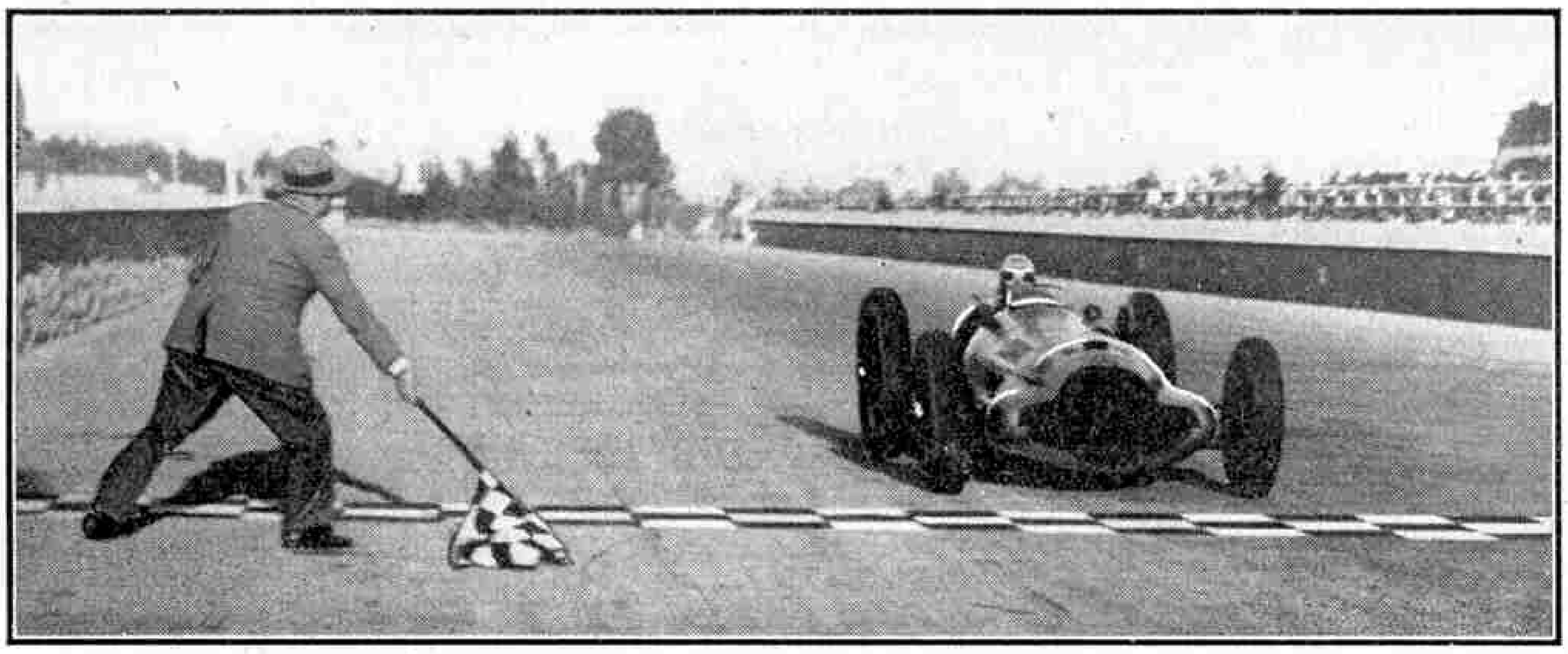
Work is now in progress on the construction of what will eventually be the widest road in this country. It is to commence at a roundabout near the great aircraft factory at Speke, Liverpool, and will extend for about a mile to the Liverpool and Widnes road at the city boundary. It will be 160 ft. wide, and will include two 22 ft. carriageways, two 9 ft. cycle tracks, and a 30 ft. central reserve. Plantations bordered by two service roads on one side of the new road will bring its total width up to 350 ft.

The Raymond Mays Car

A new 90 m.p.h. sports car, to be known as the Raymond Mays car, is soon to be introduced. The engine, which will be a 20 h.p. V-8 type, and certain other components will be supplied by the Standard Motor Company, but production in limited numbers will be carried out at the E.R.A. works at Bourne, which up to now have been concerned only with the manufacture of the famous E.R.A. racing cars. Independent front springing, and a sports saloon body will be fitted to the new machines. The price of the car is expected to be about £450.

A New M.G. Speed Car

An interesting British speed record attempt that is to be made this month is an attack by Major A. T. G. Gardner on the Class G International short distance records up to 5 miles for cars under 1,100 c.c. capacity. Major Gardner already holds the record for the flying kilometre with a speed of 148.8 m.p.h. which he attained last October in a K.3 M.G. Magnette on the Frankfort-on-Main Autobahn, Germany. This year he will drive the M.G. car shown in the lower illustration on this page, which has been specially built for the attempt.



Herman Lang, the winner of this year's Tripoli Grand Prix, crossing the finishing line in his Mercedes-Benz. Photograph by courtesy of Daimler-Benz, Stuttgart.

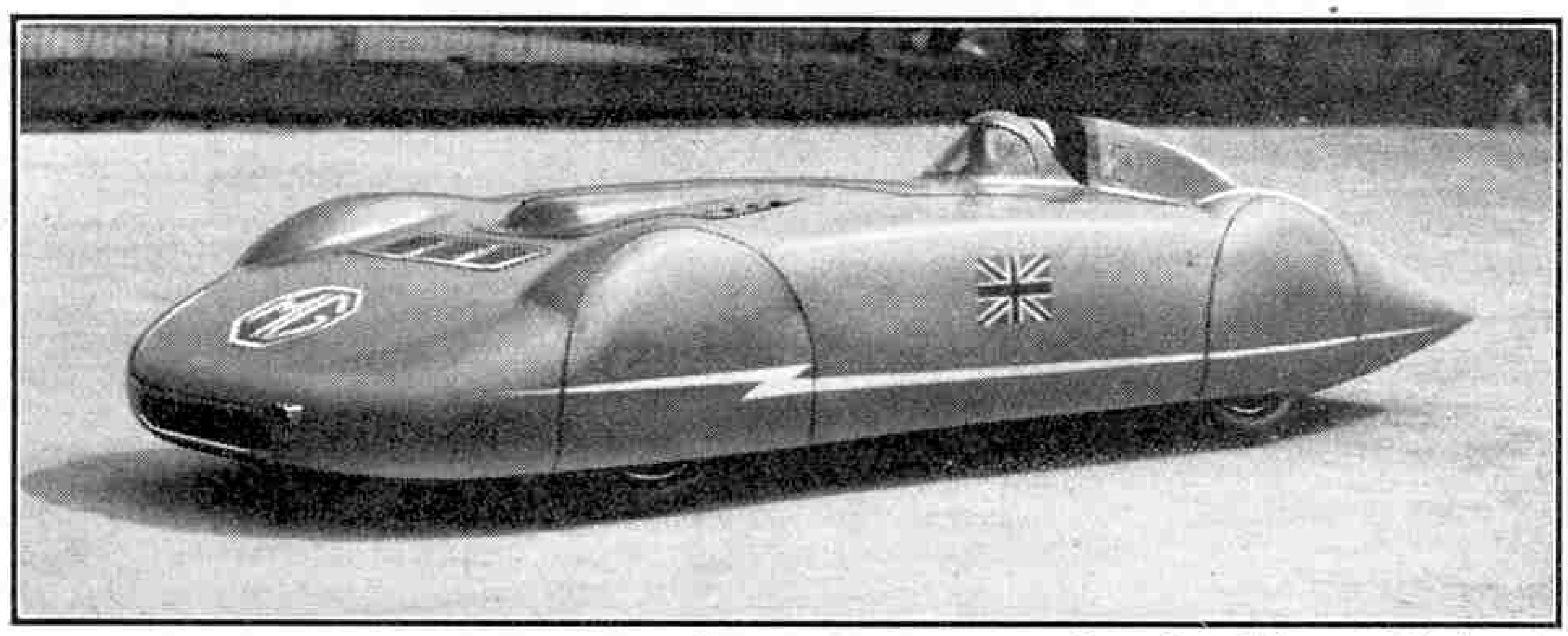
The new car has a very striking appearance. The chassis has a track of 4 ft. 0 in. and a wheelbase of 8 ft. 3 in., and the body is totally enclosed, except for a few inches around the driver's head and small openings to allow the tyres to make contact with the ground. The framework is of duralumin and is panelled with aluminium sheet, the complete body weighing only 228 lbs. The complete car with fuel weighs about 15 cwt.

The engine has six cylinders blown by a Centric supercharger, driven from the front of the crankshaft, and overhead valves. The whole of the unit is of standard M.G. design and materials, except for a small number of component parts.

According to present arrangements the attacks on the short distance standing and flying records will be made on the famous highway at Gyon on the outskirts of Budapest, special permission having been obtained to enable this road to be used.

An Automatic Speed Controller for Motor Vehicles

An interesting speed controlling device, which gives both an audible and visual indication that a predetermined speed has been attained, has been introduced by R. A. Rothermel Ltd., London, for use on private and commercial vehicles. The device is wired up to the ignition system, and works by lowering the value of the spark at the plug points so that sufficient power cannot be obtained to allow the desired maximum speed to be exceeded.



The new M.G. car in which Major A. T. G. Gardner will attempt to set up new speed records for 10 h.p. cars. Photograph by courtesy of The M.G. Car Company Ltd., Abingdon-on-Thames.

The essential part of the device is an electrode that is fixed within the bezel of the speedometer. This is connected to the ignition coil or magneto, and is placed slightly in advance of the 30 m.p.h. figures and about $\frac{1}{16}$ in. above the speedometer needle. When the speed of the vehicle rises to within about half a mile of the predetermined limit sparking occurs between the electrode and the needle, accompanied by an unmistakable crackle and the usual blue light. The ignition current then passes to earth and misfiring takes place when the actual limit is reached.

A Fine Mexican Highway

One of the finest motor highways built in recent years is that which leads from the United States boundary to Mexico City. It is known as the Camino Nacional No. 1 and is 770 miles in length. This road is the first long modern highway constructed in Mexico and is carried across precipitous canyons and several deep rivers by more than 80 bridges, the girders and materials for which had to be transported a great distance and erected under considerable difficulties in wild and mountainous country.

The completed road represents a fine engineering achievement, for although much of the route is through mountain districts all the gradients are easily negotiable. At a point not far from Mexico City the road had to be rebuilt many times owing to rock slides, which destroyed the work as fast as it was completed.

With the Record Makers

Among this year's many new motoring records the most noteworthy is the world's land speed record of 350.2 m.p.h. set up recently at Bonneville Salt Flats, in the United States, by Mr. John Cobb in his huge super-streamlined *"Railton"* car, which was illustrated and described in these pages in the August *"M.M."* Thus he improved upon the record created at Bonneville only a fortnight earlier by Capt. G. E. T. Eyston, whose speed over the measured mile was 345.49 m.p.h. Eyston's car was the famous *"Thunderbolt."*

On his first run Cobb's speed was 353.29 m.p.h., and he was the first man in the world to travel on land at more than 350 m.p.h. On the run in the reverse direction the speed was 347.16 m.p.h. At the time of writing news is awaited of further efforts by Eyston and Cobb, who are confident of reaching even higher speeds.

World Tour by Automobile

The world tour by automobile that was to have been organised by the International Association of Recognised Automobile Clubs in November, and which was referred to in the *"Road and Track"* pages of the June *"M.M."* will not now take place owing to lack of entries.

In order to avoid disappointment to those motorists who had signified their intention of entering for this tour, however, the Association is to assist them in making the trip to Calcutta or, if desired, the entire journey round the world, although the Association will not be responsible for an organised tour. The party will leave Beyrouth not later than 12th November owing to the necessity of getting through the high passes between Baghdad and Teheren before the first fall of snow.

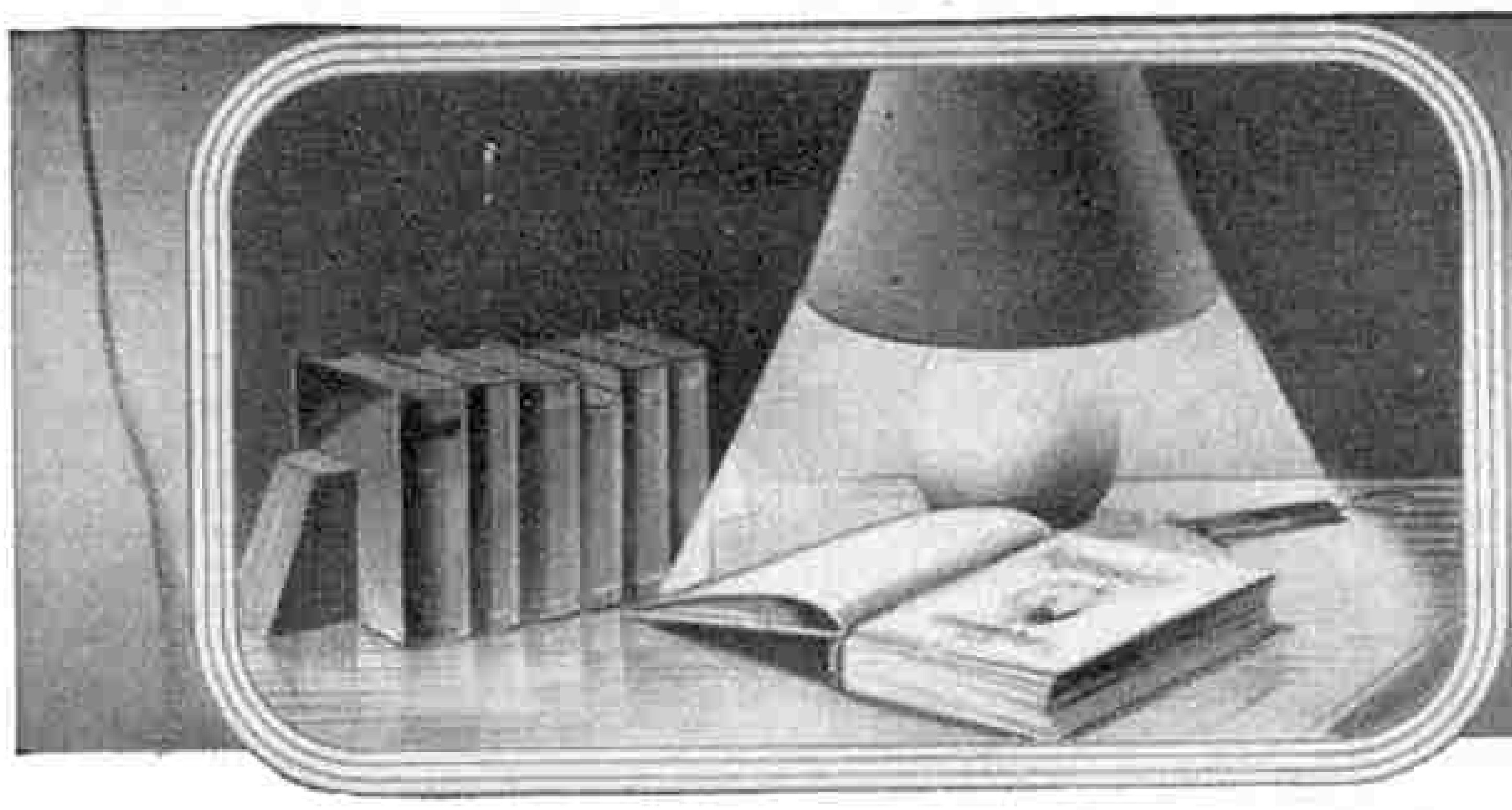
Shelsley Walsh

Raymond Mays in his 2-litre E.R.A. has regained the record for the fastest climb of Shelsley Walsh Hill. His time for the climb was 37.86 secs., representing an average speed of 54.05 m.p.h. He thus beat by just under one second the previous record of 38.77 secs. set up last year by A. F. P. Fane in the Frazer-Nash shown on the hill in the illustration on the opposite page.

Chief interest in this year's climb centred in a battle between Fane and Mays. In the first of the two runs allowed Fane travelled at a terrific speed and appeared likely to set up a new record, but unfortunately something went wrong with his engine and his car came to rest long before the finish. Mays then created the new record by brillant and skilful driving in his first run.

A notable feature of the meeting was the really fine driving and the excellent times put up by the competitors generally, 18 drivers accomplishing the climb in under 44 sec.

Outstanding among these were H. L. Hadley, who drove a 744 c.c. Austin up the hill in 40.05 secs., the second best time of the day. The fastest climb by a woman driver was made by Mrs. Kay Petre, also in an Austin, whose time was 44.83 secs.



BOOKS to READ

"On Jungle Trails"

By Frank Buck. (Harrap. 6/- net)

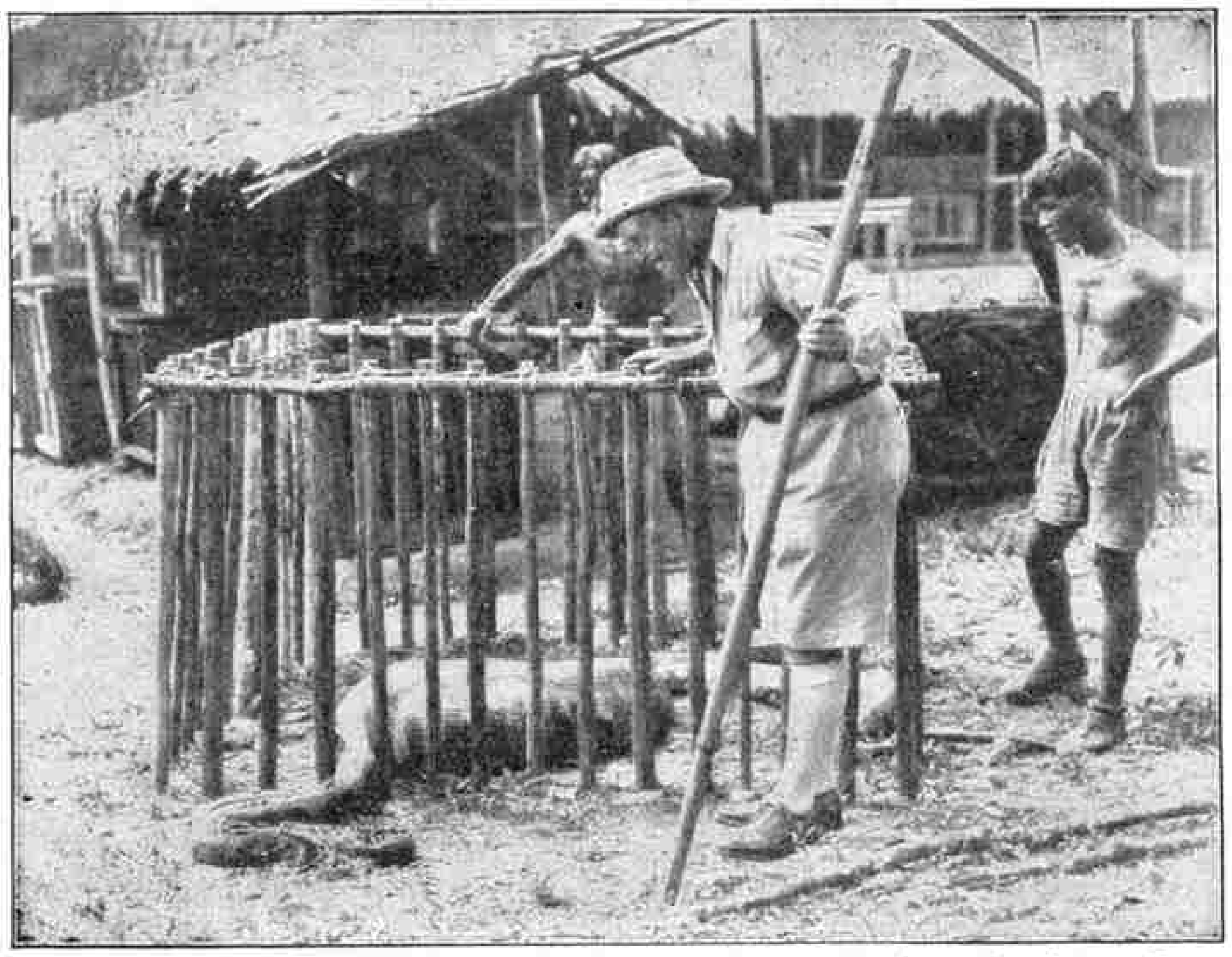
This is one of the most fascinating books we have read for a long time. Mr. Buck has spent 25 years exploring the jungle countries of the world for wild animals, not to shoot them, but to capture them. He is proud of the fact that throughout his career he has never wilfully or needlessly harmed any one of the strange creatures he has had to deal with, and in this book he gives vivid pictures of them in their homes and explains the ingenious methods he has used to secure them.

He begins with a walk through the dense jungle that is so familiar to him, with its trees and bushes bound together by great vines and creepers growing so profusely that a way can be cut through it only with the aid of a huge knife. Then we read how he captured two young wild bull elephants in Ceylon by driving a herd into an immense kraal that took two months to build, and picking out the two he wanted with the aid of tame elephants.

Even more exciting was the capture in Malaya of a clouded leopard that took refuge in a tree. With a stream of well-directed bullets the author cut the branch on which the animal stood, and this fell into a steel net that was rapidly rolled over it. There was an interesting sequel. The leopard snarled and raged for two days in its cage, but quietened down instantly when its cubs were discovered and brought to it. Next follows a description of one of the author's jungle camps, full of caged birds and animals of all kinds, with an exciting tale of the escape of a huge python.

Other remarkable stories describe the capture of a man-eating tiger in a pit, and the trapping of an orang-utan after it had been besieged in a tree for several days. In another story there are pelandoks, strange mouse deer so tiny that one of them can stand on the palm of one's hand and with hoofs that would scarcely cover a sixpence. We read also of exciting adventures with a leopard that broke loose from its cage during a voyage to America, and with a cobra that spat venom into the author's eyes while he was giving it water, and there are tales illustrating the strange customs of the natives with whom he came into contact. One of the best of these concerns Lal, his loyal Gurkha "boy."

Detailed information about animals, birds and reptiles mentioned by the author is given at the end of the book, which contains 22 splendid illustrations from his own photographs.



A python that swallowed a pig and became too large to escape from the pig pen. From "On Jungle Trails," reviewed on this page.

"Model Railway Electrification"

By Ernest F. Carter
(The Model Railway Constructor. 3/6 net)

This book specialises in the electrical side of the model railway hobby, and is a valuable guide to all owners of miniature electric railways. It does not encroach on the field covered by electrical text books, but gives as much information as is necessary to assist the enthusiast in the construction, maintenance and repair of the particular kinds of electrical apparatus that are essential in model railway work.

After a short chapter on the elements of electricity the author turns to details of miniature electric motor construction, describing the making of a home-made motor and giving hints on operation and maintenance. The various sources of power are next described, and we are glad to see that special warning is given of the danger of the use of high-voltage direct current supplies in conjunction with lamp resistances. Accumulators and transformers using alternating current supplies are recommended, but we think that the author scarcely does full justice to the popularity of the transformer.

Motors for model locomotives and various methods of track wiring are dealt with before the more advanced schemes of sectionalising and control. Automatic working of points and signals and various refinements are then described, together with the construction and operation of the apparatus required, and finally come sections on the special problems of outdoor electrification and house mains supplies.

There are nearly 200 constructional drawings and circuit diagrams, in addition to a large number of half-tone illustrations.

"The Last of the Gauchos"

By Thames Williamson. (Harrap. 5/- net)

The gaucho was a kind of modern wild man, with Indian blood in his veins, who formerly roamed the pampas of South America and considered himself its real master. He was proud, generous and brave, but quarrelsome, and to him fights, preferably with fists or knife, were commonplace happenings.

In Mr. Williamson's stirring story we meet the Blackbird, the last of the gauchos, and his son Goya, and follow them in their strange and lonely life. The former is a famous fighter, and he is arrested and imprisoned after killing an opponent. The boy tries to rescue him, but fails and eventually finds his way to an estancia, or ranch, where he tries to earn money for the purpose of obtaining his father's release. He wins a horse race, captures an ostrich, tames a wild colt and has many other adventures, in the end trailing a notorious bandit. When the Blackbird is released he is full of scorn for what he calls the new-fangled estancia life, but he sacrifices himself in a duel to foil cattle stealers and with him the race of gauchos comes to an end.

"A Survey of Railway Development and Practice"

By P. E. Garbutt. (Stockwell. 3/6 net)

This is a book for those who take their railways seriously, whose interest lies deeper than in mere familiarity with trains, locomotives, and the usual equipment and practice of railways. The author does not confine himself to British railways, but manages to compress within the limits of the book a survey of railway development in all parts of the world.

This country was the birthplace of railways, and the book commences with a brief description of the origin of the British railway system, its development, and the present-day organisations controlling it. The conduct of railway traffic in this country and the fixing of rates are discussed, and British methods are compared with those followed abroad.

On the Continent, the State has been one of the most powerful influences in railway promotion, and development there is next traced. The railways of the United States, Canada, Mexico and South America are dealt with, special reference being made to the strong British interests in many of the systems in South America, and then comes an account of the peculiar conditions of British India, and of the railway situation in the Far East, Australasia and Africa. Lastly there are sections on electric and Diesel traction and the future of railways.

"Ice Patrol"

By Kensil Bell. (Routledge. 6/- net)

The men of the United States Coast Guard Service patrol the coasts, help in the detection and prevention of smuggling, and take part in rescue work at sea. One of their most thrilling duties is that of tracking down the icebergs that in the Spring threaten shipping crossing the North Atlantic; and every year two cutters make for the Grand Banks of Newfoundland and take turns standing by there until the icebergs have melted away as they drift southward.

It is chiefly on the Ice Patrol that Jim Steel and his friends meet with the exciting adventures recorded by Mr. Bell. Most of his story is founded on fact, and records the wonderful work of the Ice Patrol in the cold, foggy and lonely regions of the Banks. There they seek out icebergs, reporting their position and drift to the masters of all vessels passing through the seas. Other things happen there too. There is a mysterious tramp steamer sadly in need of a coat or two of paint that arouses suspicion, and when Jim boards it after it has collided with an iceberg he meets a man whom he has previously overheard talking about dope in a New York Restaurant. Next a fisherman is discovered stranded on an iceberg drifting southward. He is almost dead from cold and exposure, but recovers and then acts strangely when Jim mentions the mysterious steamer. These and other incidents arouse the boy's suspicions, and on returning to New York he makes further investigations that end in the capture of a dangerous drug smuggling gang after a thrilling pursuit by air at sea.

While the story is being told we have a splendid picture of life on board a Coast Guard cutter, in which hard work, danger, and excitement are lightened by good-natured chaff and rivalry between the boys of the crew. The story ends satisfactorily with Jim securing entrance to the Coast Guard Academy to undergo a course of training that will qualify him for an officer's berth, with a prospect of eventually becoming himself the skipper of a cutter on the Ice Patrol.

This very interesting book is well illustrated by means of official United States Coast Guard photographs and line drawings.

"Tableaux, Plays and Sketches for Boys"

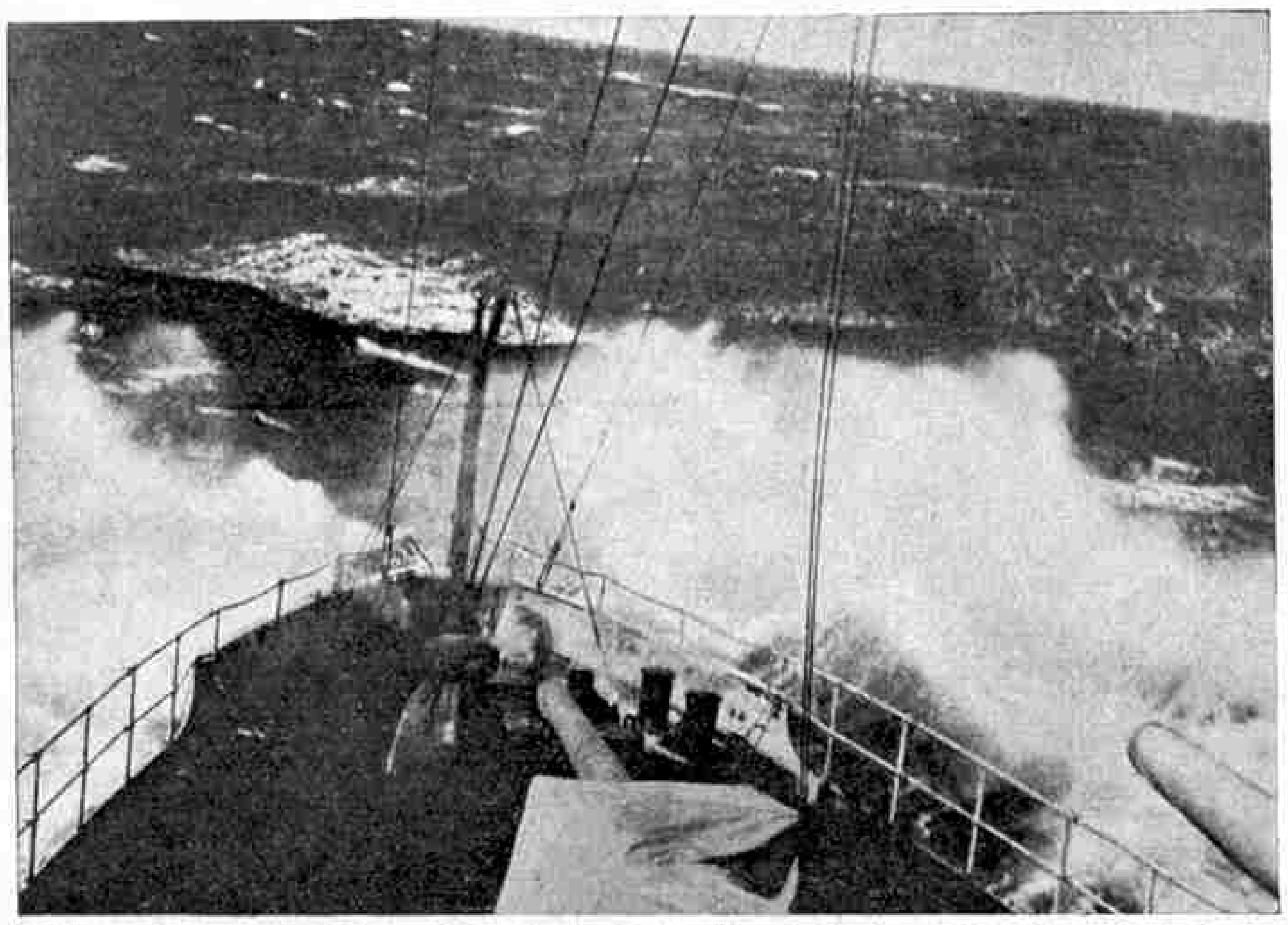
By H. L. Davies
(Brown Son and Ferguson. 1/6 net)

To many boys, particularly those who are members of clubs or Scout Troops, there is a great thrill in acting before an audience, and Mr. Davies has here supplied a series of short plays and sketches that are suitable for inclusion in concerts and entertainments given by them. These vary from Red Indian plays to comedies and farces on the one hand, and a Roman drama on the other. There is plenty of action and humour in them, and useful advice is given in regard to costume, stage management, and presentation generally as far as necessary for the simple plays given.

"Canoeing in Ireland"

By Major R. Raven-Hart
(Canoeing and Small Boat Ltd. 1/-)

Major Raven-Hart claims that in no other country of its size is there so much canoeable water or such a variety of rivers as in Ireland. The enjoyment of these is increased by delightful scenery and features of historic interest as well as the friendliness of the people met with, and he recommends Irish waters for those who are planning a holiday afloat. He describes 16 well-chosen cruises, most of which have been made by the author himself, and gives useful hints on clothing, sailing and fishing. There is a useful map, with seven half-tone illustrations.



Taking a huge sea while on ice patrol off the Grand Banks of Newfoundland. From "Ice Patrol," reviewed on this page.

"Smuggler's Risk"

By Patrick Pringle. (Harrap. 3/6 net)

"Smuggler's Risk" is an old house on the top of a Cornish cliff. There are local legends of underground passages connecting it with caves on the seashore that once were the haunt of smugglers, and Martin Cannell and Ronald Jackson stumble upon the secret during their holidays. Eventually they find themselves in a cellar that proves to be the meeting place of a gang of revolutionaries, who are using the old passages for smuggling arms into the house. The boys are captured, but escape after exciting adventures and the gang is rounded up. Readers will enjoy this thrilling story, the author of which is only 19 years of age. There is a coloured frontispiece, with four plates.

CITY OF LONDON

"City of London," an Instone air liner of the early days of commercial flying, loading mail and goods. From "Early Birds," reviewed on this page.

"Early Birds"

By A. Instone. (Western Mail. 6/- net)

The development of flying in Great Britain has been so rapid that the pioneer days of civil aviation, with their personalities and enthusiasms, are already passing into history. The aim of this authentic account of the early days of civil air transport is to preserve the memory of one of the pioneer British air transport companies, the Instone Air Line. It has been written by Capt. A. Instone, who was one of the moving spirits of that enterprise.

In 1919 the commercial disorganisation caused by the Great War was still felt, and the difficulty of speedy communication between their offices in London, Paris, and Brussels prompted S. Instone and Co. Ltd., a well-known firm of shipowners, colliery proprietors and merchants, to obtain Government permission to carry their own letters, and in October 1919 they started a private air service between Cardiff, London, and Paris. The aeroplane employed was a DH.4 single-engined three-seater biplane, one of the earliest war types to be adapted for civil use, and the pilot was the late Capt. F. L. Barnard, who is remembered as the winner of the first King's Cup Air Race in 1922.

The regularity with which these private air journeys were made, and the great saving in time achieved, led the Instone company to develop this means of transport and to make it available to the public. Early in 1920, therefore, additional and larger aircraft were purchased, and the Instone Air Line was formed to operate a regular cross-Channel passenger and freight air service. Then other air transport companies came into existence, and there was keen competition until October 1922, when a scheme was introduced under which each company was allocated a different route. On the 1st April 1924 these separate pioneer companies were merged into a new national organisation called Imperial Airways Ltd.

In recounting the story of the Instone Air Line during those few eventful years of its career Capt. Instone brings into his narrative many notable persons who played a part in getting British air transport under way. He has gathered together many interesting reminiscences that reveal the difficulties and triumphs of those pioneers. In a brief diversion from the main topic he gives Capt. Barnard's hitherto unpublished account of his flight in the first King's Cup Air Race. The numerous photographs add very greatly to the interest of the book.

"School Craftwork in Wood"

By Edwin W. Luker. (Technical Press. 7/6 net)

This book is intended chiefly for teachers and students in training, but also will be useful to all interested in woodwork as a hobby. It contains five sections, dealing respectively with craftwork in schools, the characteristics of timber, the woodworker's tools, design and working drawings. The matter is very well arranged, with a wealth of valuable information and more than 100 illustrations, with four full page plates.

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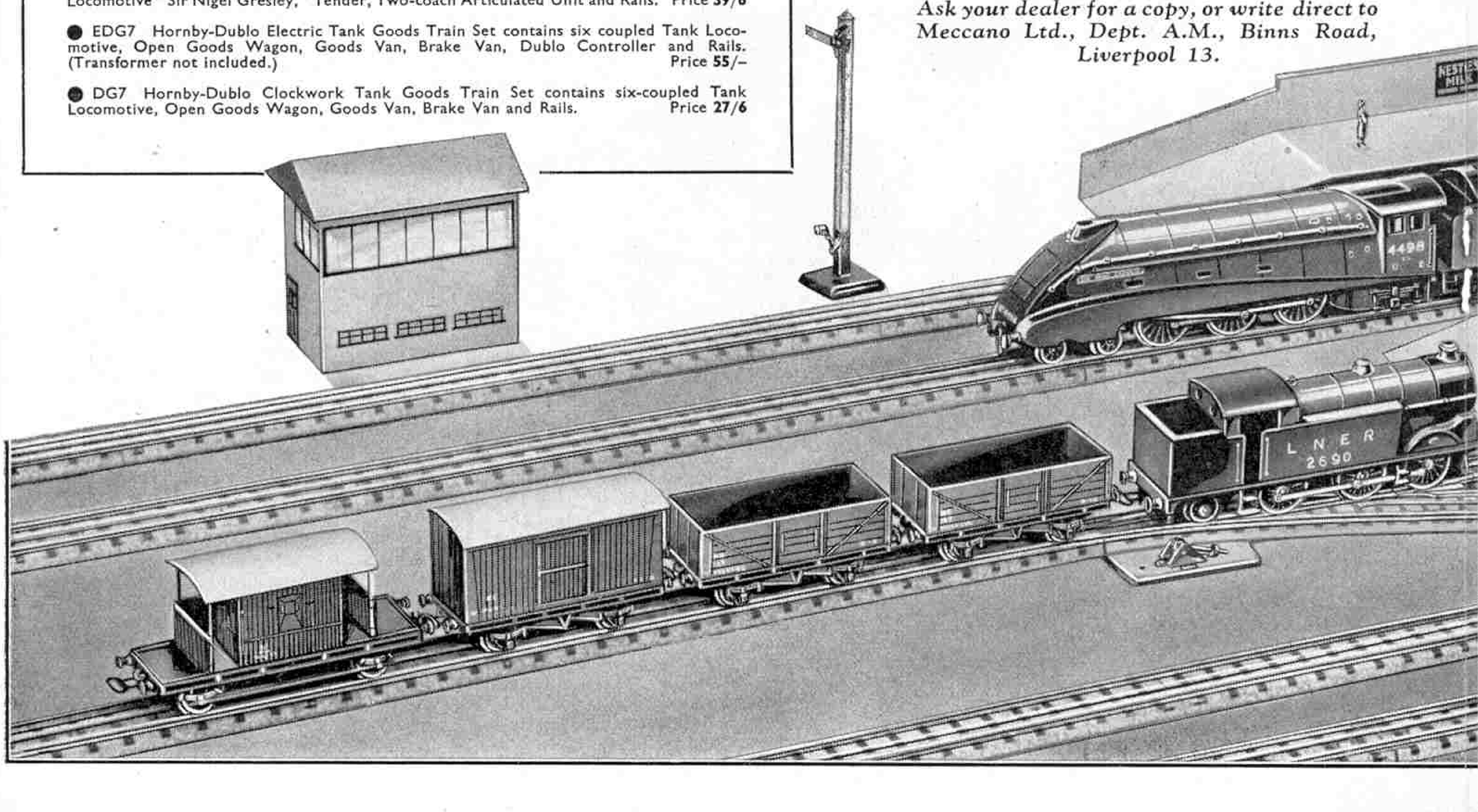
✵ DO NOT MISS THIS!

A Special Folder, beautifully printed in colour, is now available giving details and prices of the complete Hornby-Dublo range. Ask your dealer for a copy, or write direct to Meccano Ltd., Dept. A.M., Binns Road, Liverpool 13.



BY-DUBLO TRAINS

The introduction of the Hornby-Dublo System, Gauge OO, marks a notable advance towards the ideal home railway. It is the ideal system for the development of a miniature railway where space is limited. It is the perfect table railway.

Hornby-Dublo Trains are unique in their scale accuracy and beauty of finish. They have been designed with the co-operation of the Railway Companies, who supplied special photographs and scale drawings. The Trains in motion are fascinating to watch. The Locomotives are fitted with motors, either clockwork or electric, of a power and reliability never before achieved in this gauge. The Remote Control of the Electric Locomotives is perfect—starting, stopping, reversing and speed regulation are all carried out by the movement of one lever. The control is positive. Move the lever to "Forward" and the train goes forward; move it to "Backward" and the train goes backward—every time!

The track consists of solid drawn brass rails, giving the greatest electrical conductivity, mounted on a realistic metal base. All vehicles are fitted with pressure die-cast wheels that ensure perfectly smooth running. Automatic couplings, which link at any point on the track, are fitted to all Coaches, Vans and Wagons. The Signals are realistic working models of the latest upper-quadrant type. The Buffer Stops have working heads.

The Main Line Station, which is constructed in wood, is a splendid model in the modern style. It will accommodate a 3-Coach Train, and by means of printed slips provided can be named "Berwick" (L.N.E.R.), "Penrith" (L.M.S.), "Truro" (G.W.R.) or "Ashford" (S.R.), as desired. An Island Platform of similar style can be used either separately or in conjunction with the Main Line Station. There is also a Goods Depot for goods traffic.

The Hornby-Dublo Electric Trains operate on 12-volt direct current, and are intended to be run from mains alternating current through a Dublo Transformer connected to a Dublo Controller. Where mains alternating current is not available, the trains can be run from a 12-volt accumulator.

Hornby-Dublo Trains are one seventy-sixth of the size of real trains. They enable you to lay out a complete railway on your dining table!

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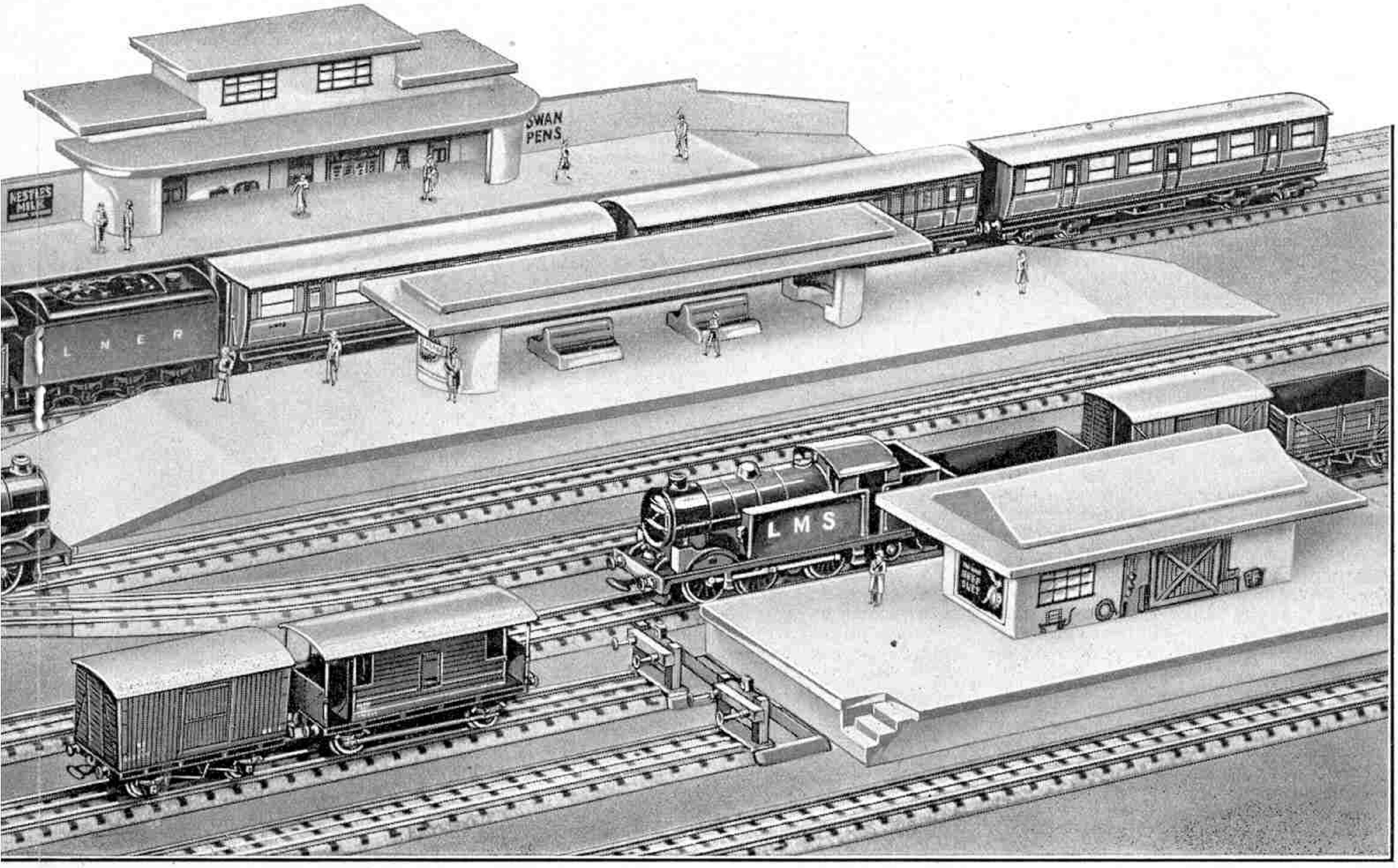
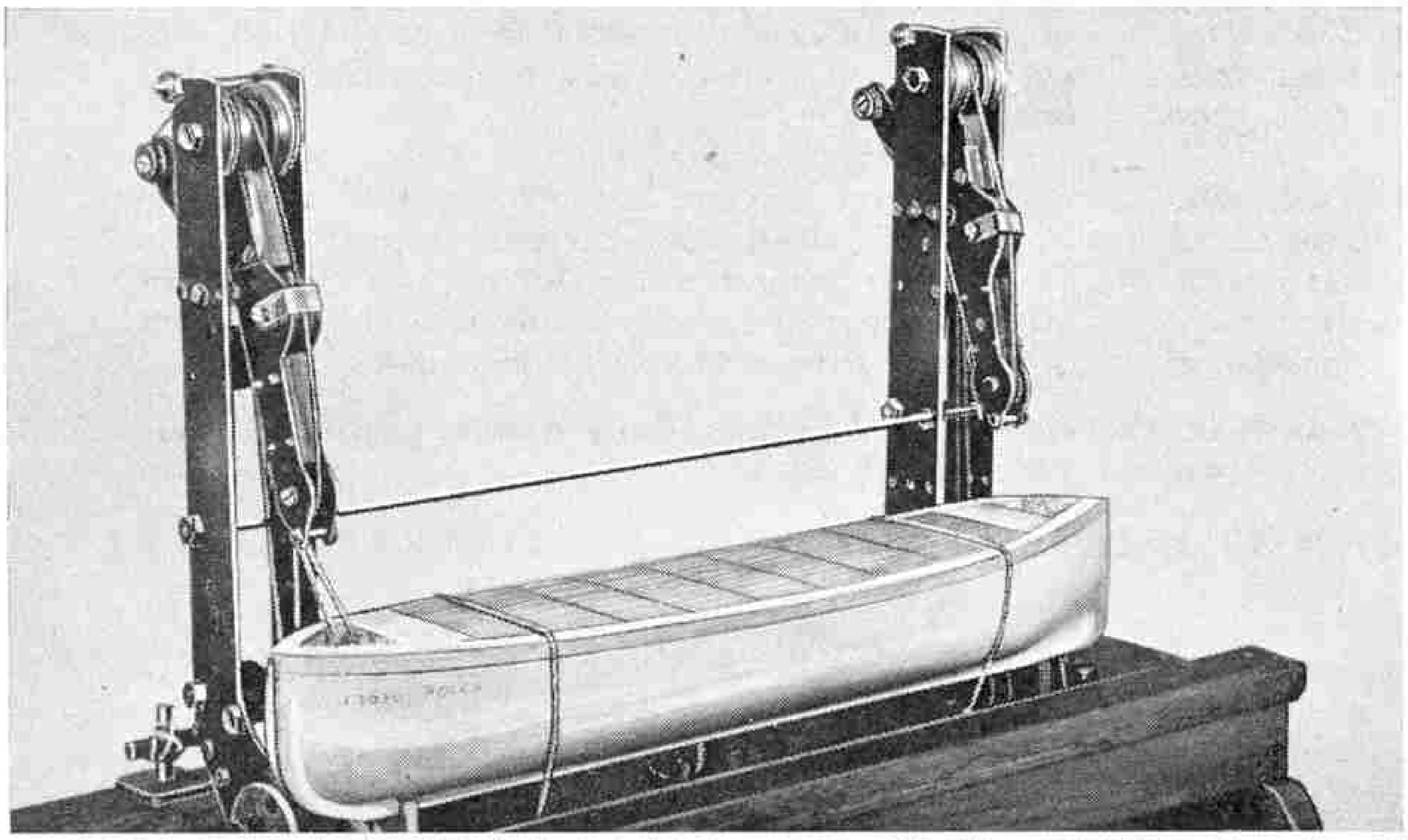


OUR BUSY INVENTORS

By P. A. Tent

Device for Launching Ships' Life-Boats

Great interest is taken in inventors in Liverpool and district, where the Merseyside Society of Inventors has been formed to give them encouragement and assistance in developing their ideas. Through the courtesy of Mr. R. G. Norris, the Secretary of the Society, I am able to give details of a particularly interesting and ingenious device that has been patented by Mr. M. Roberts and Mr. W. J. Carruthers, two of the Society's members. Mr. Roberts is a seaman who has been involved in a disaster at sea, when a sinking ship took on a list, with the result that life-boats overturned as they were being lowered. The invention is the outcome of this experience. It takes the form of extending ship's davits, from which life-boats can be launched speedily and safely in practically all circumstances.



A model of the Ro-Ca extending ship's davits devised by two members of the Merseyside Society of Inventors and described on this page. Other illustrations on these pages show the davits in action.

The name "Ro-Ca" davits has been given to the new device and how difficulties due to a list are overcome is well shown in the three illustrations on this and the next page, which show a model in operation. The davits are operated by hand, and the upright columns and the swinging jibs are so arranged that the boat is extended well out from the side of the ship before it is lowered to the surface of the water. Thus there is no fear of its coming into contact with the ship's side. The first action is to lift the boat from its rests and to swing it outboard, and only 30 seconds are required to complete the entire movement, which can be carried out by one man apart from those needed to attend to the boat falls. Another interesting feature is that boats can be swung outboard a few feet for the purpose of clearing the boat deck, and can then be lowered to another deck on which those to take their places in it can be assembled.

The Ro-Ca davits also would be found useful in other circumstances. For instance it may be necessary to lower a boat from a vessel that is taking in cargo from barges and lighters alongside. Ordinarily one or more of the latter would have to be moved, but with the new davits this would be unnecessary, as the boat can be swung out clear of the barges and lighters. Similarly boats could be loaded on the quay, or lifted from the quay to the ship, without the use of cranes or outside means of any kind.

The davits are simple in construction, and would not be unduly expensive either to make or maintain. Their simplicity and ease of operation should make them ideal for use in the difficult circumstances attending shipwrecks or sea disasters of any kind.

Electro-Plated Aluminium

After working in secret for 20 years W. J. Travers, an American chemist, discovered how to give aluminium a bright and lustrous coating. This metal has been of the greatest value in industry since its first production on a commercial scale, but has suffered from the disadvantage that it becomes covered with film or layer of oxide, less than a thousandth of an inch in thickness, which gives it a dull appearance and makes it greasy to the touch. All efforts to overcome this difficulty by plating the metal with nickel, copper, and chromium failed until the introduction of the new process, which is cheap and easily applied.

Strangely enough, the first step in the Travers process is to coat the surface of aluminium with a layer of oxide. This is done electrically, the aluminium being first cleaned in sodium cyanide and then made the anode, or positive electrode, in an electrolytic bath of chemicals that produce oxygen. The result is a hard and resistant surface, which is cleaned and placed again in an alkaline bath, from which it emerges in ideal condition for plating with metals that do not tarnish or oxidise.

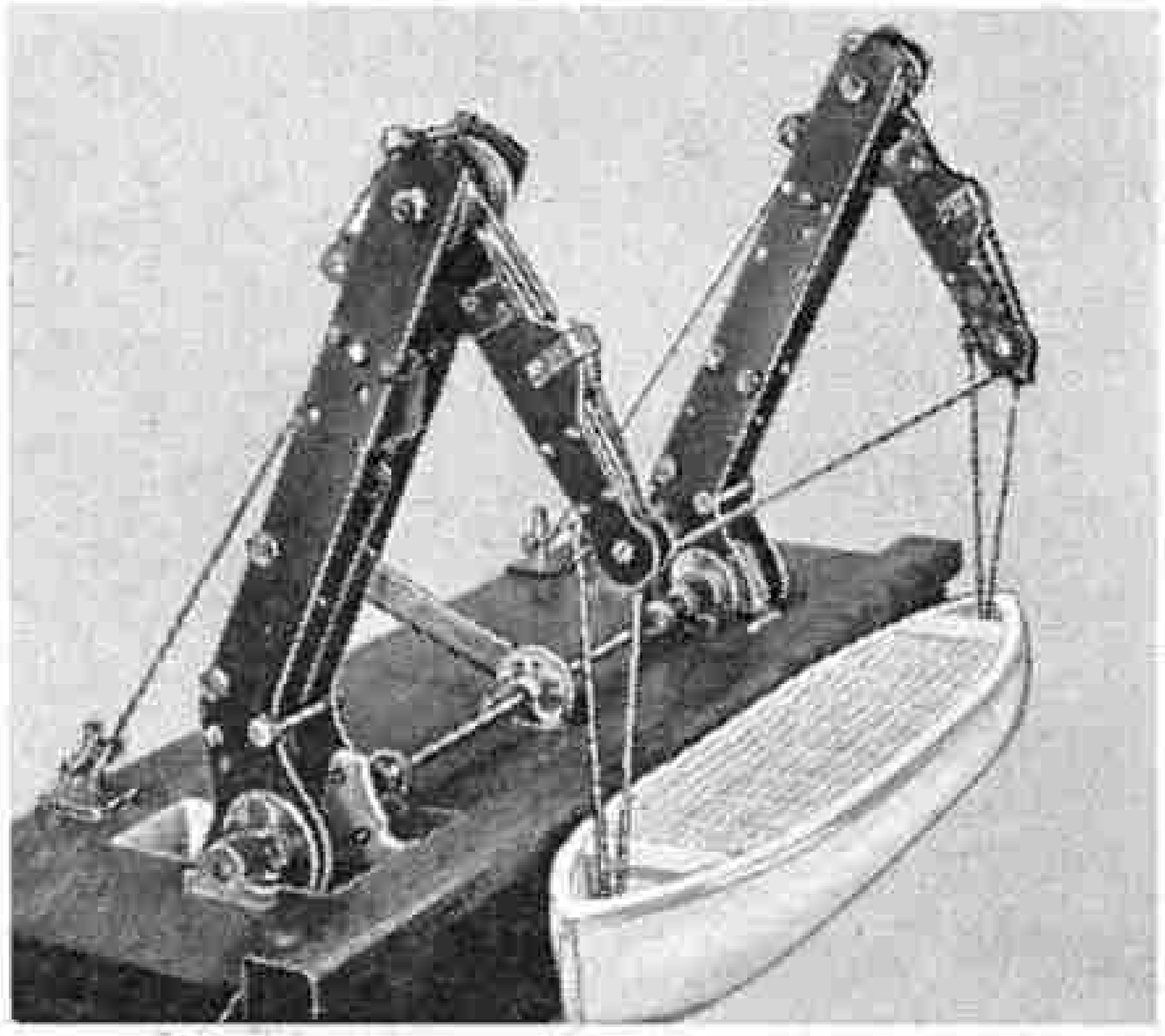
Usually the aluminium is given a first coating of nickel, after which it is plated with chromium, silver or copper as required. The result is a metal that combines lightness and toughness with resistance to corrosion. Pieces of chromium-plated aluminium have been tested by repeated and sudden changes from a temperature of 30 deg. F. below zero to that of a hot spray and back again without showing any sign of being worse for wear, in spite of the repeated expansion and contraction that this causes.

One interesting use that has been made of the new metal is in the production of aluminium pistons. When made only of aluminium or aluminium alloy these do not wear well, but chromium-plated samples remained in perfect condition during long and continuous use in special tests.

A New Safety Life-Belt

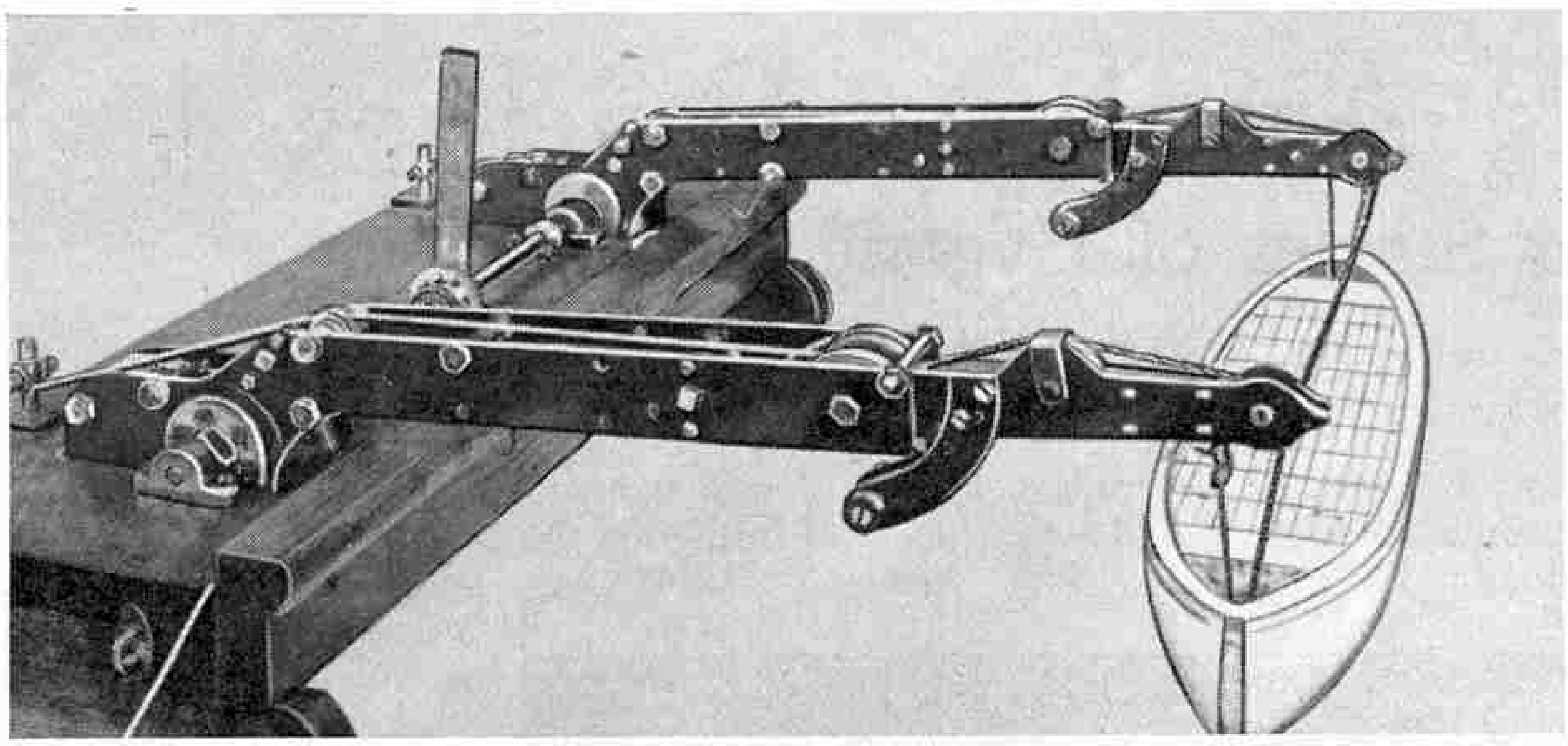
Many deaths by drowning occur every year, especially in the bathing season, and in these swimmers as well as non-swimmers often are concerned, for the finest swimmer may be helpless if he has been injured. An invention for preventing unfortunate accidents of this kind has long been wanted, and one has now been produced by an American inventor who himself once had a narrow escape from drowning. This event caused him to concentrate on the task of producing a safety device that would automatically rescue the drowning, whatever condition they may be in.

The invention is a web belt held in place by a buckle that can be fastened easily and quickly. In front of this is a rubber unit that normally lies flat, but can be inflated like a balloon by simply squeezing one end of it. Chemicals inside the unit then react to produce a gas in sufficient quantity to keep the wearer of the belt afloat with his face out of the water for many hours.



The Ro-Ca davits lifting a ship's life-boat from its rest and swinging it outboard.

The movement that releases the gas is easily learned and with a little practice would become automatic. The belt is capable of bringing a drowning person to the surface of the water a few seconds after the device is put into operation.



The movement of the Ro-Ca davits completed. The life-boat is swung well out from the ship's side, so that it can be lowered without difficulty, even when the ship has a list to the opposite side.

Gearless Transmission for Motor Cars

One of the most interesting events of the meeting of the British Association during August was the demonstration of a new hydraulic transmission for motor cars. This is a torque converter, the invention of Commendatore P. Salerni, an Italian engineer who has been at work on it for many years. The device takes the place of both clutch and gear-box, so that driving a car fitted with it is much simpler than driving one with the customary type of transmission.

Severe tests have already been made of the new mechanism. A car equipped with it started easily from rest on the level and on a hill, and it speeded up quickly as the accelerator was brought into use. Its hill-climbing power was greater than of a similar car with a standard transmission, and a run 761 miles in length over difficult roads in the North of England and Scotland gave excellent results.

In this device the power is transmitted by means of oil. The mechanism by which this is done comprises an engine-driven centrifugal pump, and a turbine, the vanes of both being specially shaped to give smooth and powerful action. The pump drives the oil in a steady stream over the vanes of the turbine, the rotation of which is transmitted to the rear axle. A special section called a reaction element is free to rotate idly when it is not in use, giving what may be called direct drive, but is anchored to a stationary part through pawls when the equivalent of gear reduction is necessary. These changes are brought about automatically as the torque, or turning power, on the reaction element varies. A simple epicyclic gear is used to give a reverse.

The use of the Salerni torque converter is not necessarily restricted to motor cars. It could also be used for driving machinery of all kinds, including that of trains and liners.

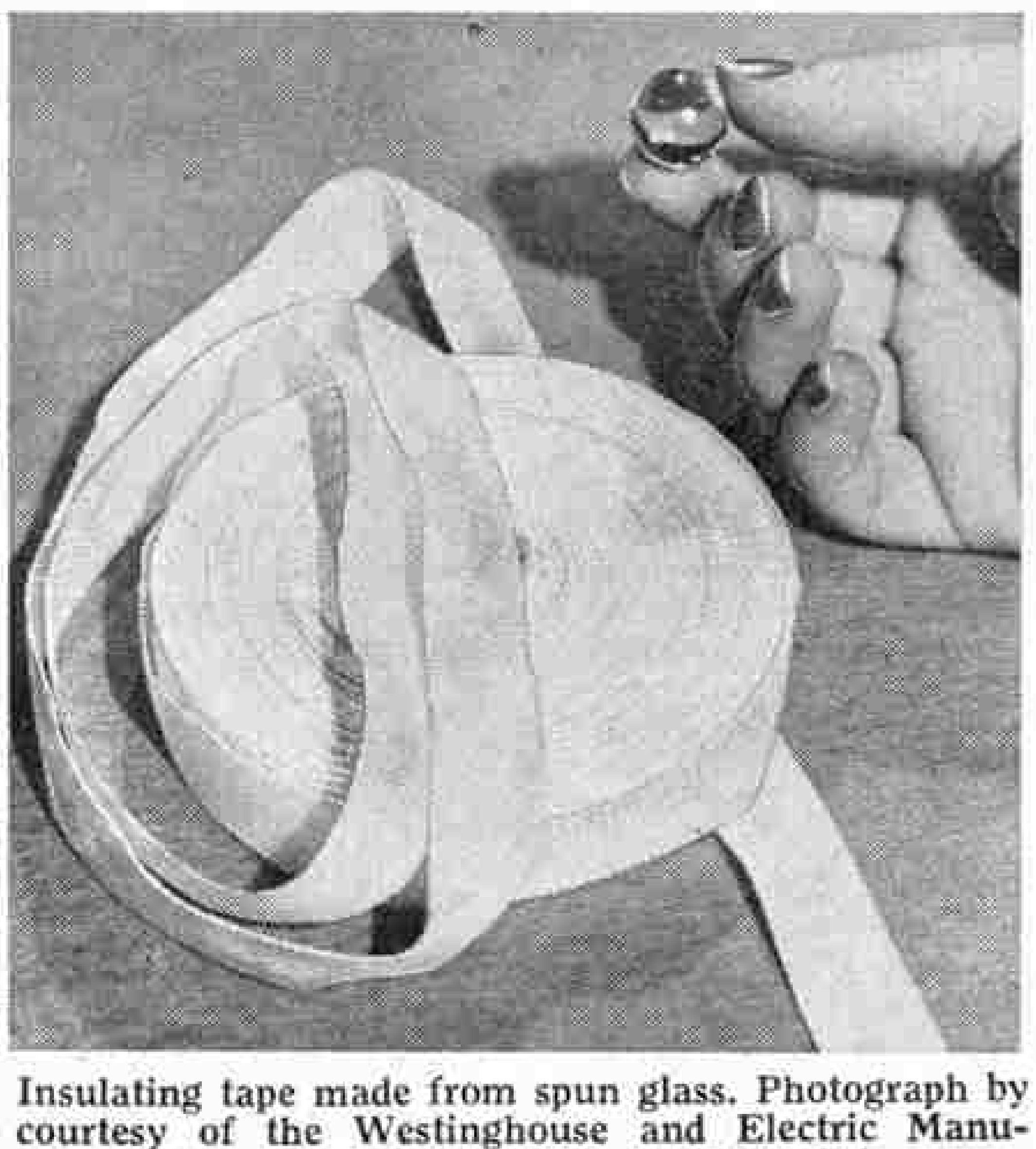
This invention is not the first in which power is transmitted by oil. Hydraulic couplings are used in industry because of the smoothness with which they act and their capacity to absorb sudden changes in torque, or turning power. The well-known Daimler Fluid Flywheel now incorporated in certain motor cars is an example. In addition various forms of hydraulic torque converter have been introduced since the original invention in 1905 of a mechanism of this kind by Dr. Föttinger, a German engineer. To readers of the *"M.M."* the best known of these is the one fitted in Leyland gearless buses, which was described in the issue for January 1934.

Torque converters have not come into general use because they are not so simple and inexpensive to make as clutch and gear-box transmissions. One of their disadvantages is that a certain amount of power is lost, and this reappears in the form of heat in the oil, thus making coolers necessary. It is claimed for the Salerni converter that the oil did not become heated, even during the long test run already referred to.

Insulating Tape from Marbles

Soft and satiny fabrics made entirely of glass are now coming into use, chiefly so far for industrial purposes. These have been developed by the Owens-Illinois Glass Company in America, and one of their products is insulating tape that is being used by Westinghouse Electric and Manufacturing Company in the manufacture of motors and other electrical machines. The engineers of the Westinghouse Company believe that the new tape will supplant certain cloth fabric installation materials now employed. In appearance it is silky, and it has the great advantages that it is fire proof and does not absorb moisture.

The fibrous glass of which this new material is made is produced from glass marbles, which are of convenient shape and size for feeding into the melting tanks employed. These have a very large number of holes in them and through these the molten glass falls to yield filaments that are detached in bundles and placed on a rapidly revolving steel drum. In another method live steam under high pressure is used to "blow" the melted marbles. The filaments produced are dried by passing through a gas flame and then delivered to a conveyor that carries them in a cobwebby mass over forming wheels, where they are changed into loose strands or slivers. They are then wound on spools and afterwards twisted and woven in much the same manner as ordinary fibres.

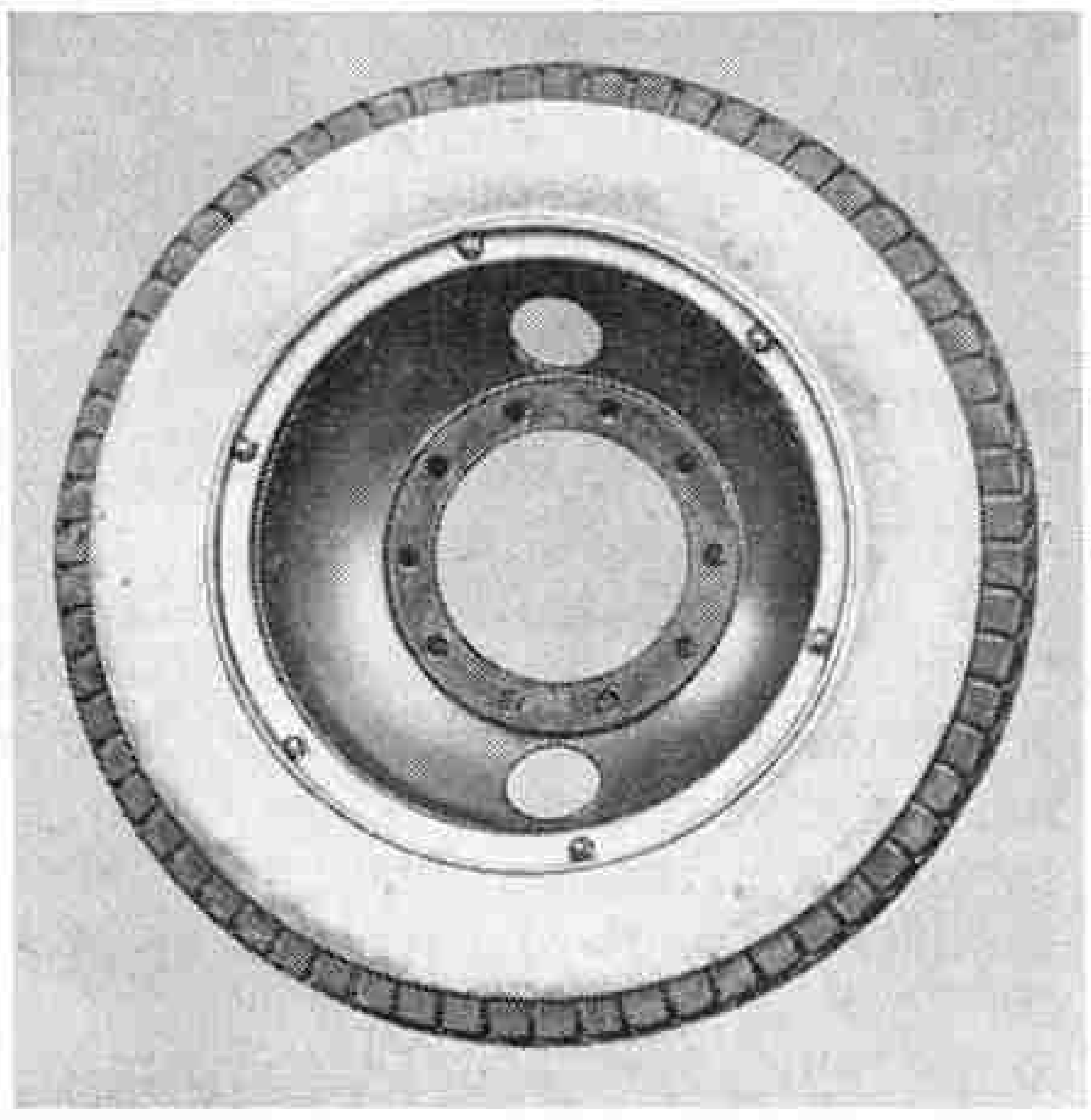


Insulating tape made from spun glass. Photograph by courtesy of the Westinghouse and Electric Manufacturing Company, Pittsburgh, U.S.A.

A glass marble three quarters of an inch in diameter yields fine strands of which eight would be required to make up the thickness of a fine human hair. Each marble yields a strand more than 150 miles in length, and 204 of these are twisted into each thread. Even finer fibres than this can be produced. In the laboratories of the Owens-Illinois Glass Company glass has been spun into fibres so fine that a single strand from a piece of glass weighing 2 lb. would be long enough to encircle the Earth at the Equator, and leave about 1,000 miles over.

Making Motor Tyres Bullet Proof

The illustration below shows an ingenious device for preventing wear on the sides of tyres of motor vehicles. These can easily be damaged by scraping them along curb-stones or against other obstacles, but all risk of this kind is removed by the fitting of the curved steel rim shown in the illustration. It is easily placed in position, and by taking all shocks it not only prevents damage to the tyre itself, but also saves puncturing the inner tube. It can be manufactured in a form to fit readily to any type of car or lorry wheel, and its use does not involve any alteration to existing wheels or tyres.



A curved steel rim that prevents wear on tyres due to scraping on kerbs. Photograph by courtesy of Mr. H. E. Hampton, the inventor of the device.

A very interesting feature of the invention is that it makes tyres bullet proof, for it turns with the wheel and any foreign body, such as a bullet, would be deflected immediately on striking it. It is therefore specially suited for fitting to the tyres of army vehicles of all kinds.

Escape Lung for Submarine Crews

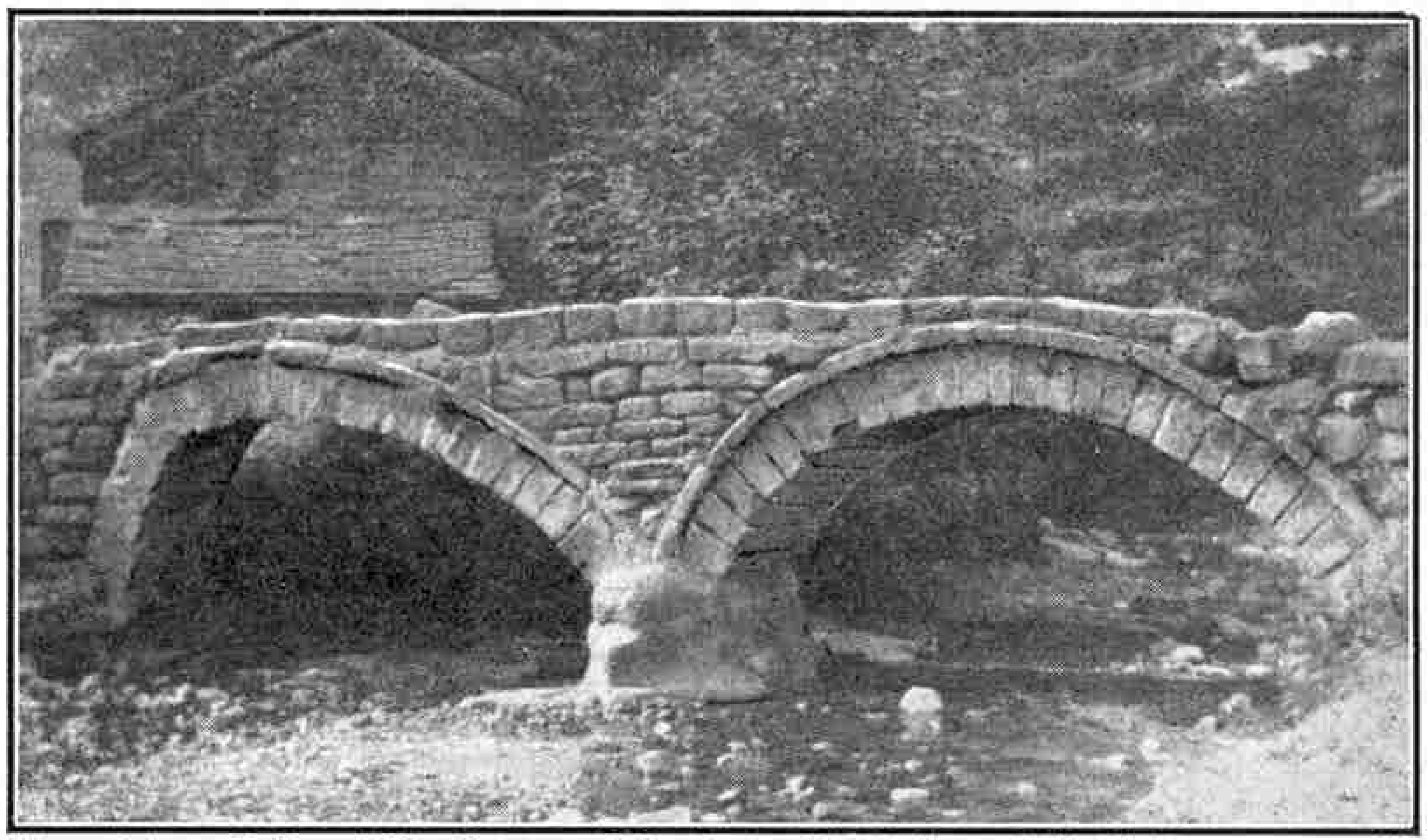
A new escape lung has been invented by a naval officer in the United States for the use of submarine crews trapped below the surface. It consists of a bag containing oxygen that is strapped over the chest. A tube leads from the bag to the mouth, and the wearer of the device is compelled to breathe through the mouth by the use of a clip that grips his nose. He then inhales oxygen from the reservoir in the bag, and carbon dioxide in the breath exhaled is removed by means of soda lime.

Britain's Ancient Bridges

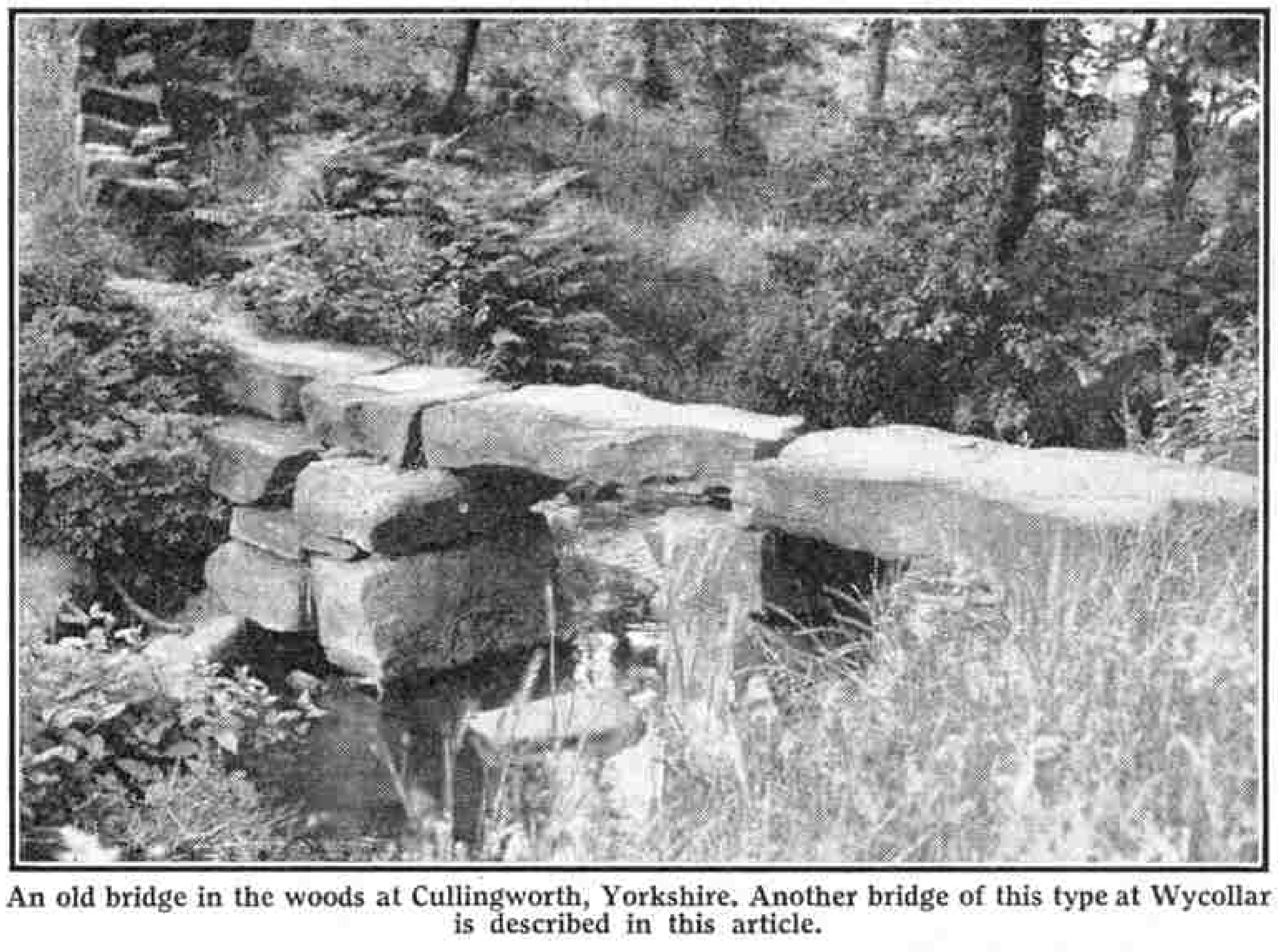
Quaint Stories of Bygone Ages

By G. Bernard Wood

ANYONE who travels through the many counties of Britain must often be struck with the almost infinite variety of bridges spanning rivers and smaller streams. However diverse they appear to be in design, most of them can be roughly classified, and the classification would give us a very interesting history of bridges, showing their development from the simplicity of stepping stones to the grandeur of a fine suspension bridge, such as that built across the Menai Strait by Thomas Telford, or the majesty of such a mighty structure as the Forth Bridge.


The pack-horse bridge at Wycollar, near Colne, Lancashire. Bridges of this kind are narrow, with low parapets to allow room for the bulging panniers of the pack-horses.

Only a few examples need be given to indicate the progress that has taken place during the centuries in this important matter of crossing a stream. At Wycollar, near Colne, in Lancashire, several stages in the evolution of bridges are plainly visible. When primitive man was faced with the problem of reaching the farther bank of a stream, he probably resorted first to the use of tree trunks. Some fallen tree would be dragged to a point where the stream's course was narrow, and there it would be reared on end and lowered, or perhaps allowed to drop, so that the other end came to rest on the opposite bank.


An old bridge in the woods at Cullingworth, Yorkshire. Another bridge of this type at Wycollar is described in this article.

A slight advance on this obvious method is seen in the Druids' Bridge, which spans Wycollar Beck. Instead of the fallen tree, the bridge consists of a monolith, or single stone, about 12 ft. long and nearly 3 ft. wide. It must weigh several tons, and as it is supported on each bank by a rough boulder, one can safely assume that it was placed there deliberately. By whom? The name that it bears indicates its antiquity, and some authorities claim that it is at least 2,000 years old!

Not far from Druids' Bridge the same beck is spanned by Weavers' Bridge, one of the lintel type. It consists of three great, flat stones supported by two stone pillars placed in mid-stream. The flat stones resemble door lintels, and from this the type gets its name.

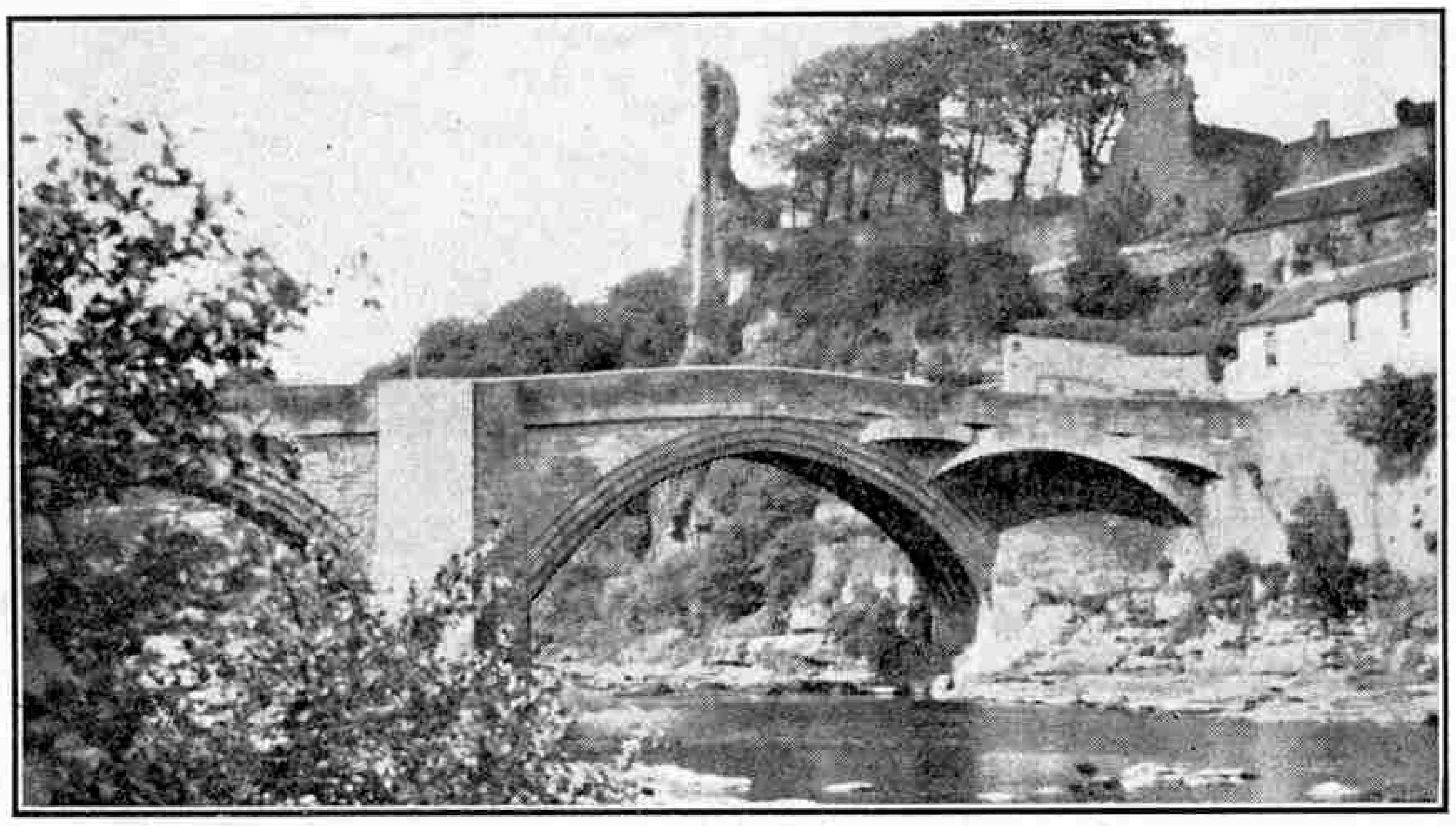
This design probably was evolved from stepping stones. Early man would frequently see such stones covered in times of heavy rains. What could he do in this emergency? By a later date he seems to have raised the height of the stones, and then to have placed a series of flat stones on top, thus producing what are now known as the lintel and clapper type of bridges, of which there are several examples on Dartmoor. Wycollar's specimen gets its name from the weavers who at one time crossed this interesting old bridge when going to and from their work at neighbouring mills.

Yet another stage in bridge-building is represented by Wycollar's beautiful stone pack-horse bridge. This was built in the 13th century. It has a very low parapet, a feature that is common to most bridges of the pack-horse type, for then no obstacle was presented to the bulging panniers of the pack-ponies and horses. The narrower the bridge the greater the need for a low parapet.

Some bridges were constructed so as to provide protection for those who lived in the town or village beyond. Occasionally the foe to be guarded against was a legion of devils! The bridge that spans the Little Ouse at Brandon, Suffolk, is of this kind. When looked upon from above, its course is seen to resemble a great letter Z. Evil spirits, so they believed in bygone days, could not negotiate the acute angles of such a bridge!

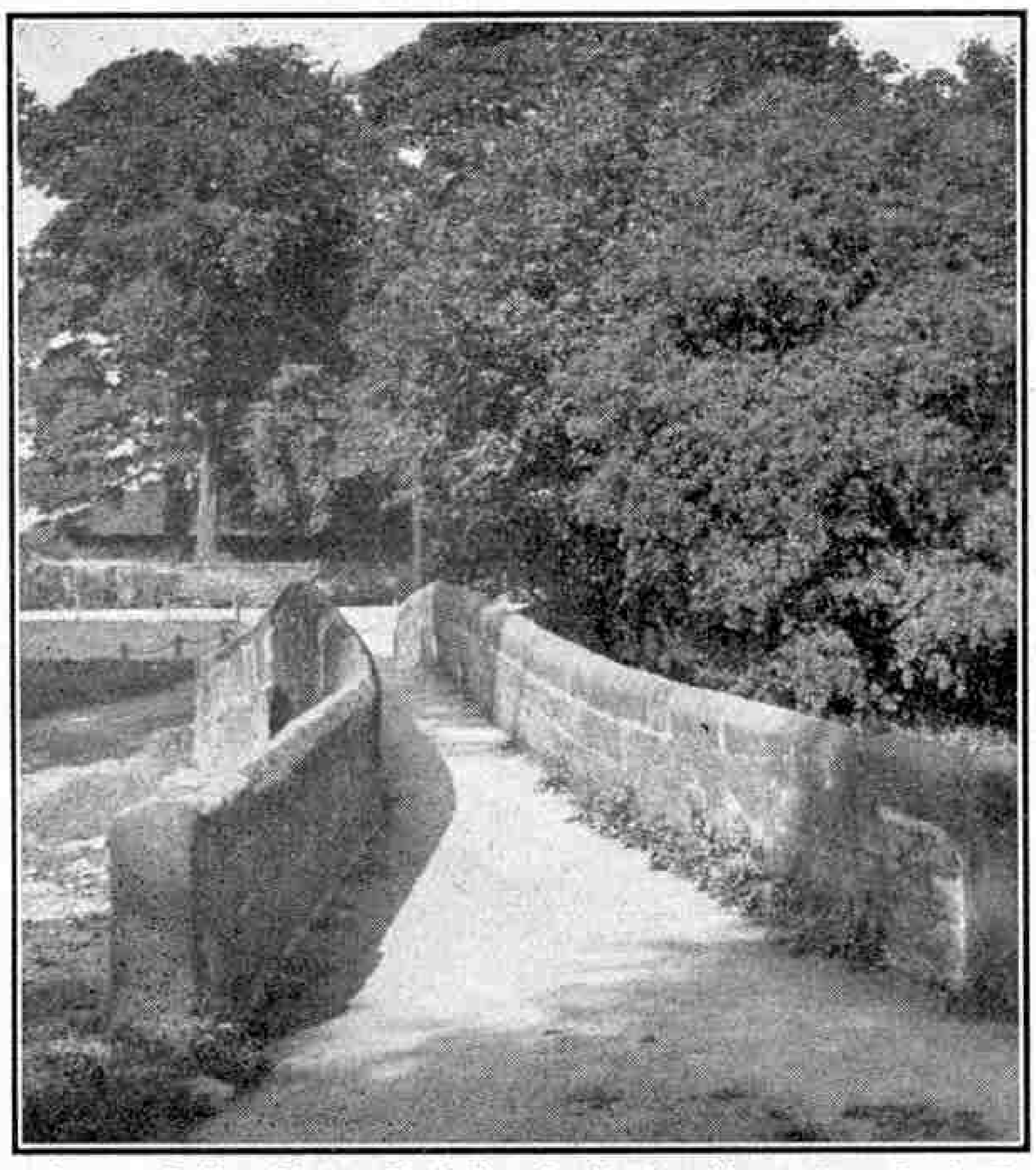
More frequently defensive bridges were erected on account of really tangible enemies. The famous Monnow Bridge at Monmouth is a splendid example. A massive gateway dating from the 13th century straddles across one end of the bridge, presenting in past days a formidable barrier to any who would attack the town. When news of an approaching foe was received, the gate was closed, and boiling liquids were poured down upon the assailants from machicolations, or projecting galleries in the upper part of the gateway.

The only other surviving military bridge in England is at Warkworth, Northumberland, where a low gateway stands at the town end of the lovely, sweeping arch. An extra traffic way is now provided, but originally all wagons and wayfarers had to pass beneath the very low arched gateway. Narrowness and gateways with low entrances were great assets in bridges of this type, for with such restrictive features they were comparatively easy to defend.


The County Bridge at Barnard Castle, connecting Yorkshire and Durham. Houses were originally built on this fine old bridge, and one remained on it until comparatively recent times.

The High Bridge at Lincoln is one of the few remaining bridges that still support houses and shops. Little of the actual structure can be seen, but its 22-ft. span is very substantial, and has borne its great burden since about the year 1160. Many bridges were built upon in this manner during the Middle Ages. Towns were then very compact and shops and dwellings were naturally crowded on to the main bridge thoroughfare.

County Bridge, a fine old structure at Barnard Castle, linking Yorkshire and the county of Durham, retained one of its houses until comparatively recent times. A man named Cuthbert Hilton lived there in 1760, and because his house occupied a central position on the bridge, where "the Lord Bishop's writ did not run," he was able to earn a livelihood by celebrating marriages in true Gretna Green fashion!


Redmayne Bridge, Linton, Yorkshire. Invitingly wide at the ends, in the middle it is too narrow to allow carts to be taken across it.

Some of the most interesting buildings ever erected on bridges were chantries, or chapels. These date from the Middle Ages, when the Church exhibited a great concern for the building of bridges and for their maintenance. Fortunately Wakefield and Rotherham still retain their chantry bridges, and at Wakefield a service is held annually in the tiny chapel, which juts out from the parapet and is partly supported from a narrow strip of earth in the River Calder.

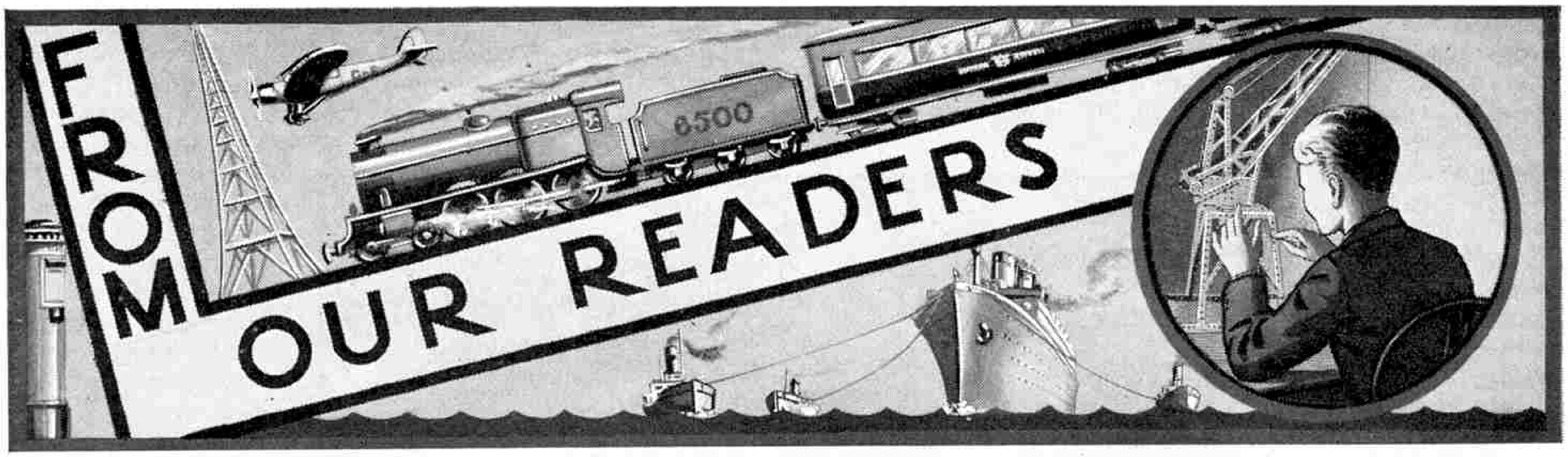
Bridge foundations have often created difficulties for their builders. At one time it was customary, when the piers could not be made secure, for a human life to be sacrificed in order to achieve this end. Declaring in their superstition that "the bridge needs a life," the workmen would actually erect part of the masonry around some young person. Evidence of this frightful practice has been found in Germany and in our own country!

It is stated that a certain bridge in Cornwall was built on a foundation of wool, because of the shifting sands that the structure had to span. This story has been scoffed at by some, but a similar expedient was resorted to in erecting the Mississippi River Bridge, near New Orleans, a few years ago. The river-bed is an unstable mixture of silt and mud, and an enormous mattress of saplings bound together with steel cables was spread over the area to be bridged in order to provide a firm base for the foundations.

Yet another type of bridge is that represented so well by Beggar's Bridge at Glaisdale, near Whitby. In one glorious sweep, its stone arch describes almost a semicircle in linking the two banks of the River Esk. This bridge had a romantic origin. Tom Ferres was no richer than a beggar when he vowed to build a bridge at this spot. He was in love with Agnes Richardson, daughter of a wealthy landowner, and he had to wade across the river in order to keep tryst with her. Years afterwards, when his fortune was made, he returned to claim his sweetheart and to erect, in 1621, the bridge that was born of his former troubles.

Romance of another kind surrounds the old Border Bridge at Berwick-on-Tweed. This splendid stone structure was built in the reign of James I, and has seen many an encounter between the English and the Scottish. It is a long, low bridge with some fine cutwaters, but it has one peculiarity that shows how any bridge, of whatever type, has to be adapted to local circumstances. This is the position of the longest arch, which is not in the centre, but at the Berwick end, where it accommodates the strong flow of water at this point.

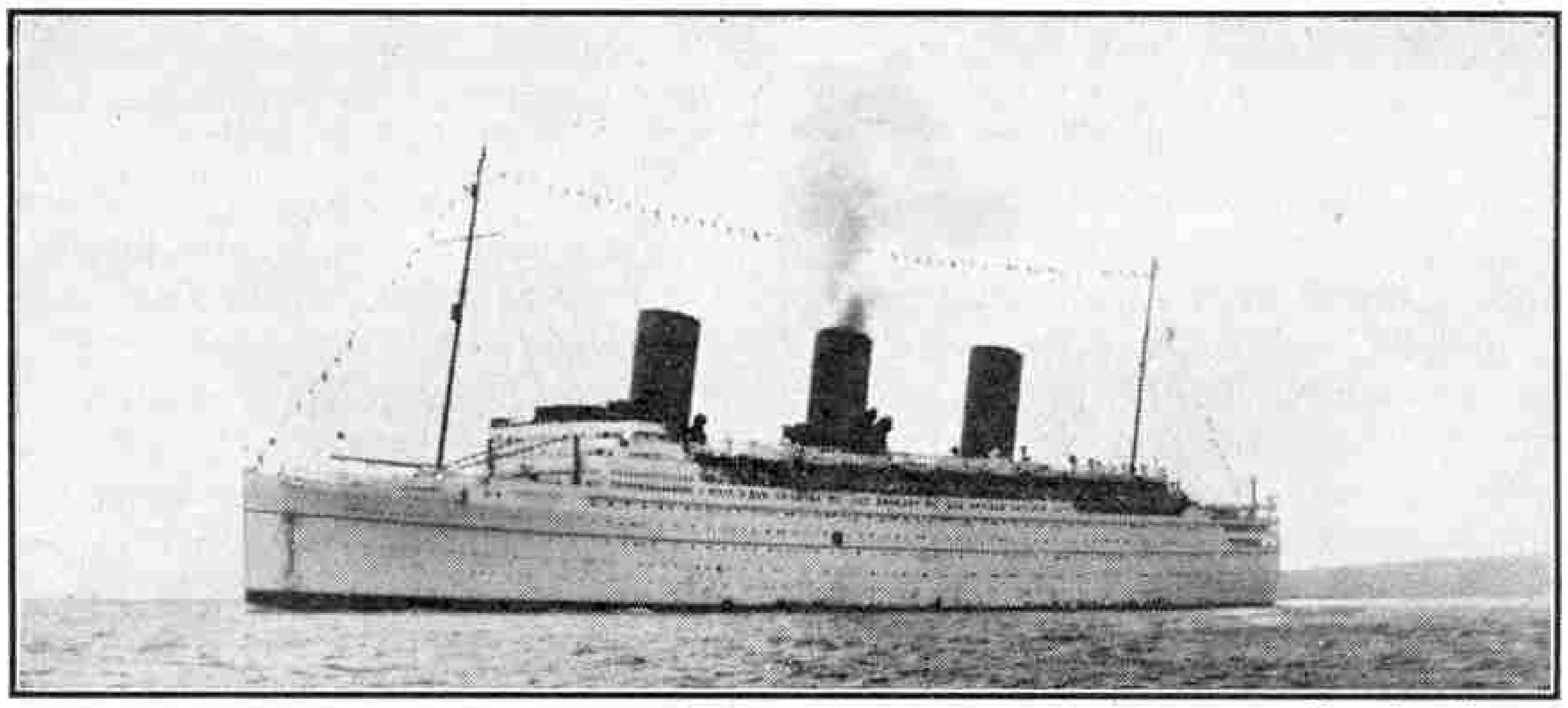
Local circumstances account for Redmayne Bridge, in the Yorkshire village of Linton, near Grassington. This stone structure was erected about 250 years ago by Mrs. Redmayne, the village benefactress, who realised the need for a bridge at this spot, and asked local farmers to share the cost. They refused, whereupon the lady built it at her own expense, but made it invitingly wide at both ends and extremely narrow in the middle, so that the niggardly farmers could not take their carts across!



These pages are reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.

"Empress of Britain" Visits New Zealand

12th April 1938 was made a memorable day for the port of Auckland, New Zealand, by the visit of the *"Empress of Britain"* while on a 35,000-mile world cruise. Although she is larger than any liner previously accommodated there she was successfully berthed at Prince's Wharf, where dredging had increased the depth for her visit.



The "Empress of Britain" steaming into Auckland Harbour, New Zealand, while on a world cruise this year. Photograph by R. Combes, Auckland, New Zealand.

Shortly after 7 a.m. the pilot boarded the *"Empress of Britain"* at the harbour entrance. Added interest was given when the transtasman greyhound *"Awatea"* passed the liner, then slowed down and escorted her into the inner harbour. Off the North Head waiting tugs steamed alongside and made fast, and with these pouring forth clouds of smoke, the vessel moved slowly to her berth.

At the critical moment the pilot let go the port anchor and slowly the great ship turned using it as a pivot. After straightening up she was gently nosed into the wharf, so easily and so skilfully that one would have thought that the sole job of the pilot was to berth 40,000-tonners.

Her departure on Good Friday was equally impressive. With screws turning over to assist the two tugs, the "floating city" slid gently out into the stream, where the pilot straightened her up. Then she moved ahead, steadily increasing her revolutions, until with three long piercing blasts she thanked her tugs and said "goodbye" to Auckland.

As she steamed down the harbour with her three big buff funnels boldly standing out and her white hull gleaming in the bright sunlight, she left behind her a picture that will live long in the memories of the Aucklanders. Thousands of people watched the liner's arrival and departure. R. COMBES (Auckland, N.Z.).

Rathlin Island

Three miles from the rocky promontory of Fair Head on the Antrim coast stands Rathlin Island, stark and defiant amidst the swirling, lashing currents of the Atlantic. It is rarely possible to reach the island save by a devious, eight-mile course from Ballycastle Bay. It is like a sock in shape, being nine miles long and two miles wide at its narrowest point.

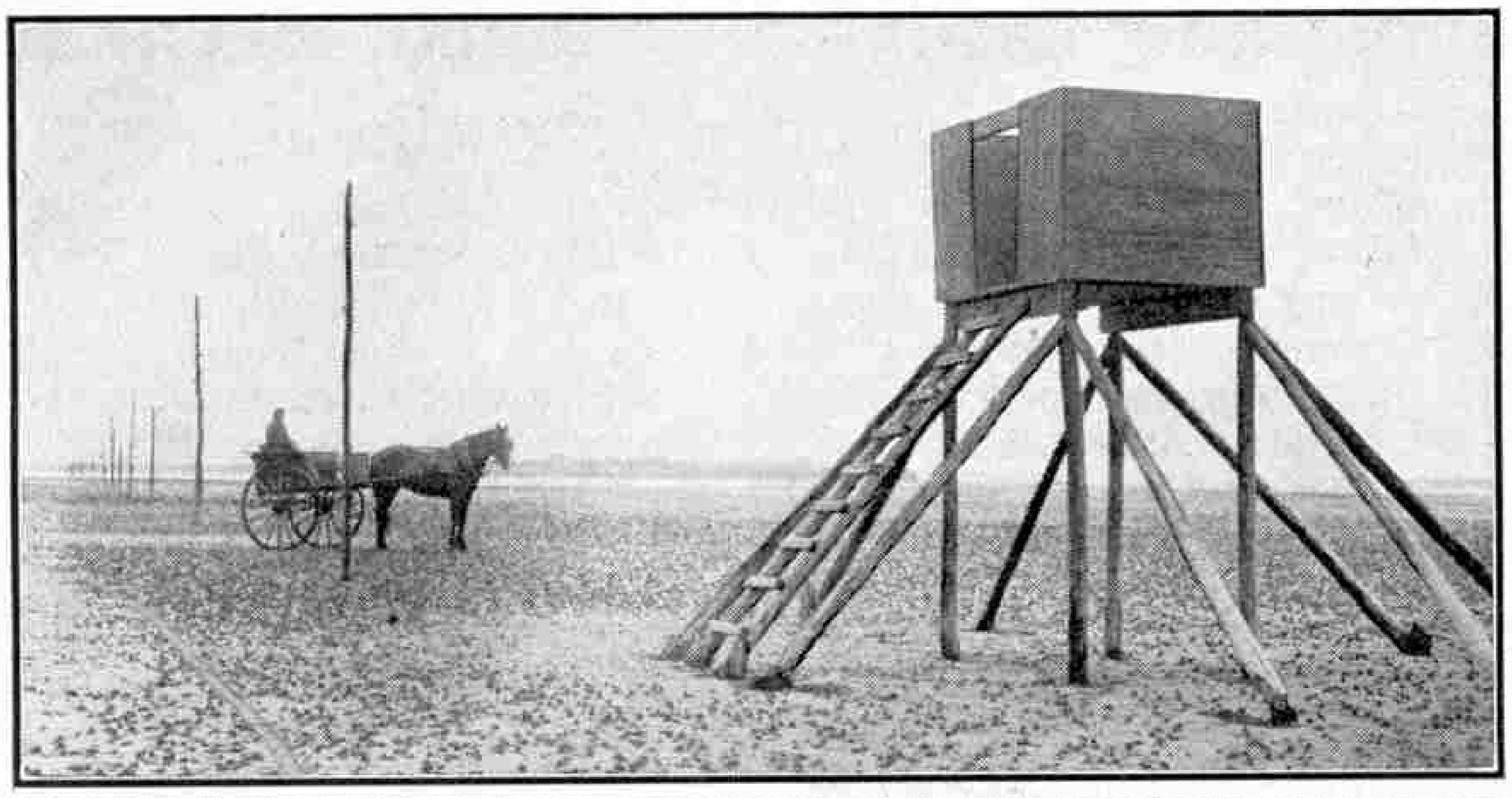
There are 600 inhabitants on the island. Nearly every family owns a cow, and cultivates such wheat and vegetables as need demands, while rock salmon provides fairly plentiful fishing. Rough roads connect the straggling farmhouses with the occasional village post office-cum-general store and tiny school. The island even boasted a police force of two officers at one time, but apparently the inhabitants proved so law-abiding that the policemen ultimately were withdrawn and stationed elsewhere!

On board the mail boat crossing to Rathlin Island. Photograph by R. Watson, Manchester.

Motor launches from the mainland visit the island twice a week with mail and other necessities during the summer months, but when the winter gales set in communication by means other than wireless often is severed for weeks at a stretch. Some years ago a farmhand broke his arm and a doctor had to be brought over from Ballycastle. While the injury was receiving treatment, however, the tides and currents changed so unfavourably that all hope of an immediate return was abandoned. It was not until three weeks later that a passing American liner was sighted, the doctor taken out by small boat, and placed on board. He eventually landed at Glasgow, took a train to Stranraer, crossed by boat to Larne, and finally reached home again after a long absence. Robert Bruce once took refuge in one of the caves along the north shore of the island. R. WATSON (Manchester).

Horse-Drawn Traps that Go to Sea

While touring in Northumberland recently I arrived at the coastal village of Beal, and on looking seawards saw a long line of vertical poles stretching out to Holy Island, three miles away. I discovered that they were erected many years ago to indicate the safe route across to Lindisfarne, as the island used to be called, for there are dangerous quicksands.



A "refuge" for anyone caught by the tide while crossing the sands to Holy Island, off the Northumberland coast. The line of poles shows the safe route between dangerous quicksands. Photograph by G. B. Wood, Leeds.

Holy Island is only isolated from the mainland at high tide, however, when the sands are covered to a depth of two or three feet. As it was full tide at the time of my visit I had to travel across the sands in a horse-drawn trap similar to the one seen in the upper illustration on this page.

As we splashed our way along the "avenue" I noticed that a small arrow is nailed at the top of each pole, pointing towards Holy Island. Thus anyone enveloped in a sea mist while crossing the sands can check his direction.

Other erections for the benefit of wayfarers are two wooden "refuges." Anyone caught by the swiftly-rising tide can climb into one of these boxes and be perfectly safe until the tide ebbs, or until he is "rescued." G. B. Wood (Leeds).

Rattray Head Lighthouse

Readers are no doubt familiar with the name "Rattray Head," for it frequently occurs in weather forecasts. You will remember "gale warning in operation all coasts north of a line from Rattray Head to Slyne Head." There are miles of sand dunes around Rattray Head, and about a quarter of a mile out to sea is a hidden reef that is dangerous to shipping. Many vessels have been wrecked there, but not so many since a lighthouse was built at the Head.

Wading out to Rattray Head Lighthouse, Aberdeenshire. Photograph by Rev. R. I. Mitchell, Fraserburgh.

Last summer I visited the lighthouse, or the "Rock," as the keepers call it. In order to get there I had to wade some distance through shallow water to the landing at the bottom of the tower. There a rope was put round me, and I was helped up a perpendicular ladder, 30 or 40 ft. high, until I reached the entrance to the main part of the tower.

Once there I had a look round. On the lowest floor in the bell-like foundation of the lighthouse are the compressed air engines that work the foghorns, and also tanks of paraffin for the lamp. Every kind of spare part is kept there too. The engines are run every week without fail to keep them in trim and to reveal any parts that may be faulty. The men live in the narrower part of the tower. I climbed the narrow, spiral staircase and saw first the kitchen with its grate and cooking utensils, then the living room, and above that the sleeping quarters. Surmounting all is the lantern chamber, reaching to nearly 200 ft. above sea level.

In good weather the men are able to go ashore for stores and perishables. Once a week things like water and coal are taken out by boat.
Rev. R. I. Mitchell
(Fraserburgh).

The Moa of New Zealand

When Europeans came to settle in New Zealand, they found quantities of strange fossil bones, generally in caves, while others were dug up during road-making and while draining swamps. Most of these bones were unusually long and thick. They were those of a bird, and when sufficient had been collected to allow complete skeletons to be put together it was realised that the bird must have been 12 ft. high, the king of all birds.

The Maoris called the bird the moa, and it is generally known by this name. Wing bones have never been found, but it is believed that the bird had so easy a life, with plenty of food within easy reach and no beasts of prey to hunt it, that its wings disappeared through lack of use.

The last of the moas lived 300 to 400 years ago. Remains of them have been found in many different parts of New Zealand, some in the Southern Alps of the South Island. One case in which moa remains were found interested me very much, for they were discovered by my uncle when exploring a cave on his sheep farm. In this cave there were the remains of six moas. The birds do not seem to have been quite as tall as the average, the tallest being 8 ft. high. An expert was hired to assemble one of the skeletons, and it is quite a curiosity to see it standing up. Its appearance makes one's thoughts drift back to bygone ages, when the country was in a wild and bushy state and these monsters were roaming the land.

Moa skeletons are also on view in the museums. These stand as high as 12 feet, higher than the ostrich and emu.

The Maoris first settled in New Zealand about 500 years ago, so that information about the moa can be obtained from their early legends and hunting traditions. In addition many bones have been found in ancient Maoris cooking ovens. A moa egg 10 inches long was taken from a grave where it rested in the hands of a skeleton.

T. Swarbrick (New Zealand).

Brakes for Working Meccano Models

Reliable and Easily-constructed Mechanisms

MOST model-builders at one time or another find themselves in need of brake mechanisms. In this article therefore we are describing several different types of Meccano brakes suitable for incorporation in cars, cranes, locomotives and other working models. The mechanisms dealt with are based on brakes of various kinds used in actual engineering, and all are simple to assemble and can easily be modified to suit individual requirements.

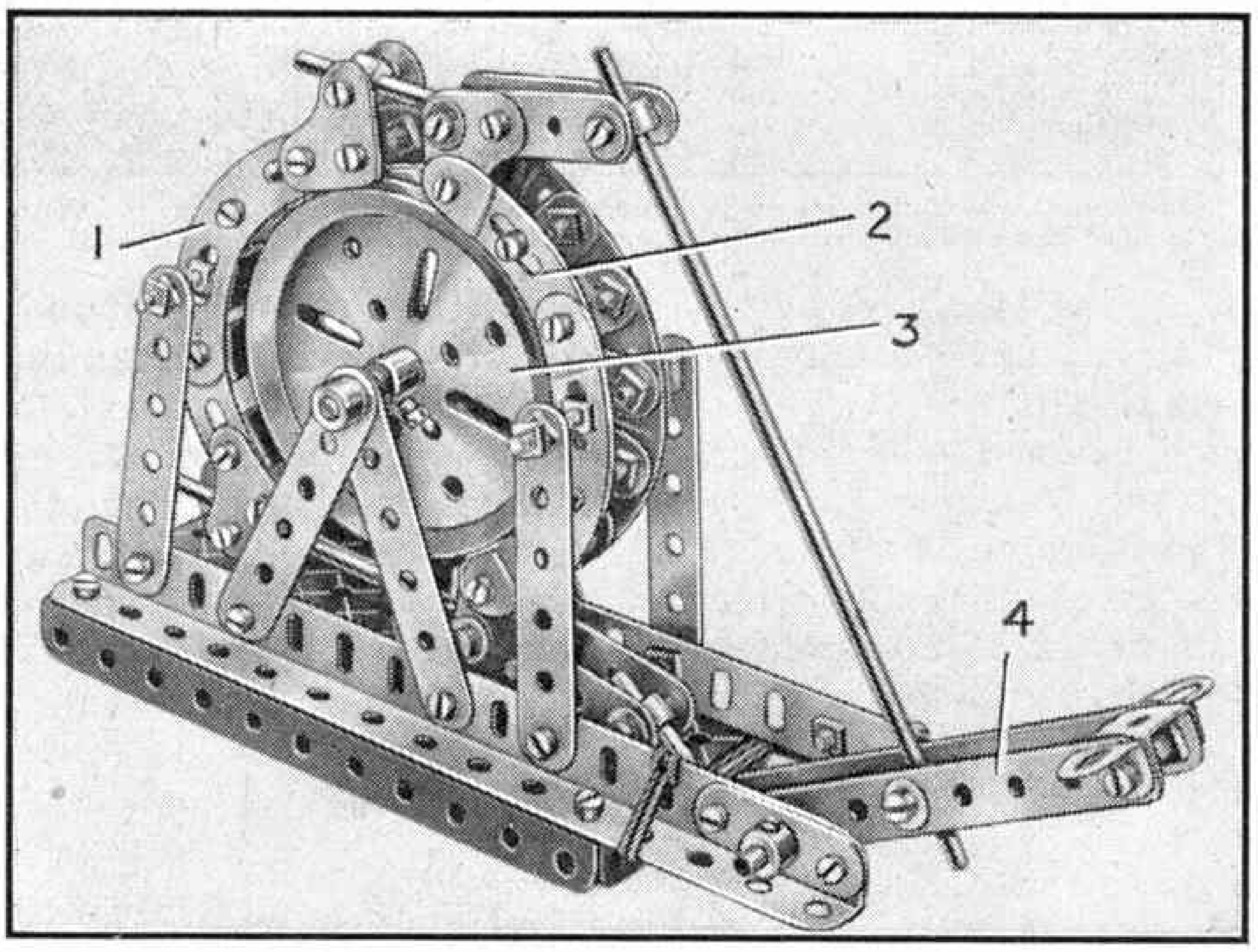


Fig. 1. A powerful model colliery engine brake operated by a foot lever.

One of the most popular mechanical brake systems is that known as the internal expanding type. Brakes in this class have one or more brake shoes, which when operated are forced outward by means of cams, springs or levers against the inside of the rim of a steel drum fixed to the axle it is desired to retard. The shoes are made of steel and are lined with a fabric that is tough enough to stand up to the hard usage involved.

Brakes of this kind having only one shoe, which forms almost a complete circle inside the brake-drum, usually are fitted to motor cycles. A typical Meccano brake of this kind is shown in Fig. 5. The drum 1 is carried on the wheel hub and houses the brake shoe 3, which is mounted on the fixed plate 2. The shoe is a 12½″ Strip bent to fit closely inside the drum 1, and it is pivoted at one of its ends on a ¾″ Bolt. The other end carries two Couplings bolted together, the lower part being fixed on a 1½″ Rod, which at its opposite end carries a Crank 4 that is connected by flexible cable to a brake lever. When the Crank 4 is pulled by the cable the Couplings move and force the brake shoe against the inside of the brake drum. A flexible cable can be made by pushing a piece of wire through a length of Spring Cord.

Internal expanding brakes fitted to motor cars usually have either two or four shoes in each drum, and the methods used for expanding the shoes vary considerably. One example is shown in model form in Figs. 2 and 3. The brake drum is formed by a Boiler End. A Face Plate 2 carries the brake mechanism, which consists essentially of two shoes 3 formed by bending 2½″×½″ Double Angle Strips to the same radius as the Boiler End 1. Double Brackets are bolted at one end of the Double Angle Strips, and these are pivotally attached to a 1″ Screwed Rod. The other ends of the Double Angle Strips are held in contact with a cam 4 by a short length of Spring Cord.

The cam that forces the brake shoes against the drum consists of a Threaded Boss fitted with two set screws, each screw carrying two washers. The Threaded Boss is lock-nutted on the end of a ¾″ Bolt, against the head of which is locked a Flat Bracket 6. A bearing for the Bolt is provided by the second Flat Bracket shown in Fig. 2. The brake is operated by a flexible cable 8, which is anchored at one end in the Collar 7. When the wire 5 is pulled, the movement of the Flat Bracket turns the cam 4 and the brake shoes press against the Boiler End. The other end of the Spring Cord should be similarly anchored, and the end of the control wire should be attached to the end of the brake lever.

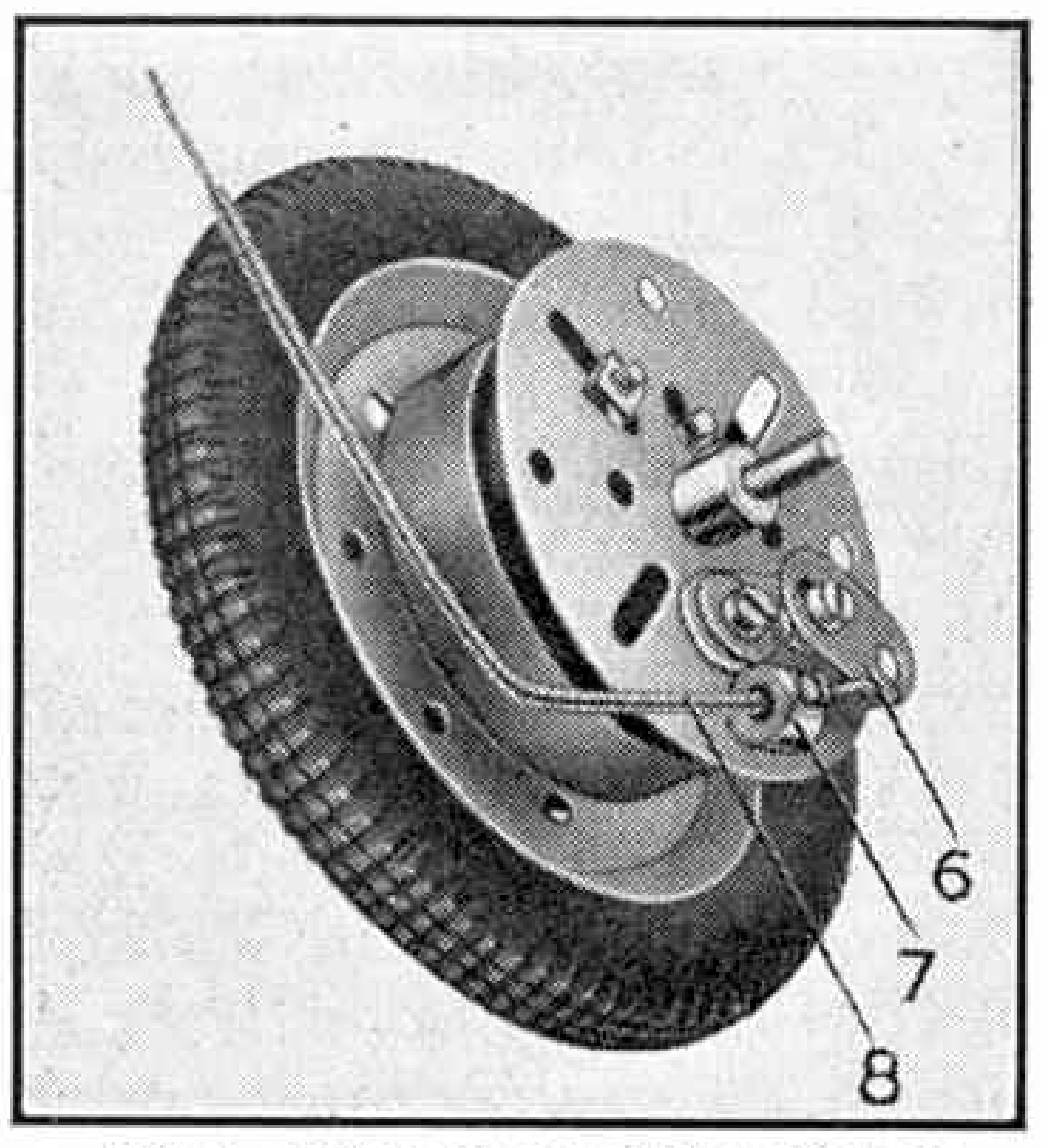


Fig. 2. Brake for a model motor car.

Winches, hoists and similar powerful mechanisms usually are fitted with external contracting brakes. These operate in a manner directly opposite to that of the internal expanding types already described, the shoes being so constructed that they contract and grip the outer surface of the drum.

External contracting brakes differ considerably in design, but the basic principles on which they operate are identical. Fig. 1 shows a model of a powerful brake of this kind designed for retarding a colliery winding engine model. In an actual brake the drum is fixed on the same shaft as the winding drums that hoist and lower the cages.

In the model the brake drum 3 consists of two 3″ Pulleys, and the shoes are each built up from 3″ Curved Strips joined together with Flat Brackets. These latter parts form the friction surface. Each shoe is supported by a 1″ Screwed Rod pivoted to a 3″ Strip lock-nutted to an Angle Girder of the base.

A 1″ Corner Bracket is bolted direct to each end of the shoe 1, and similar parts are pivoted on lock-nutted

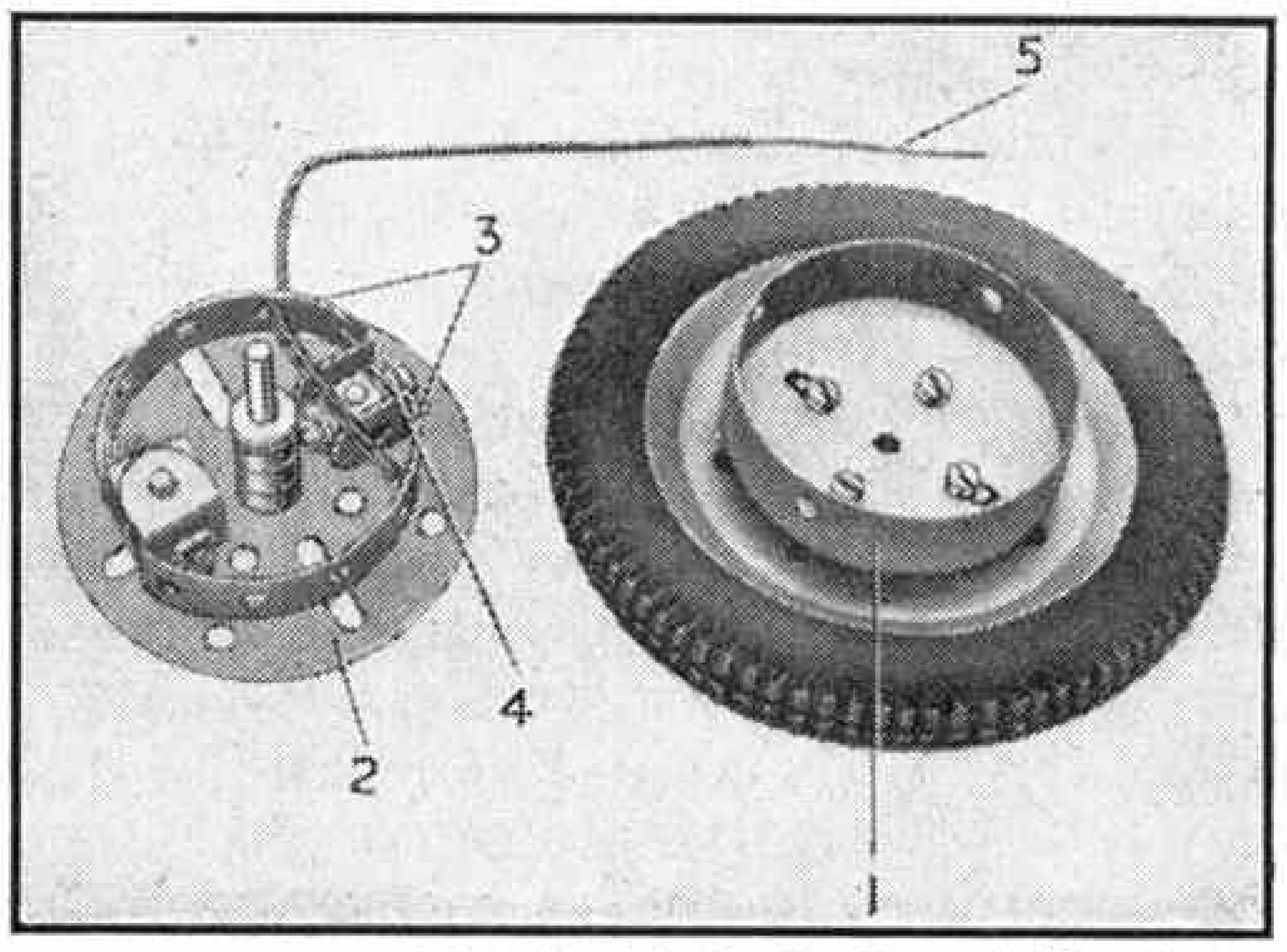


Fig. 3. Internal details of the brake shown in Fig. 2.

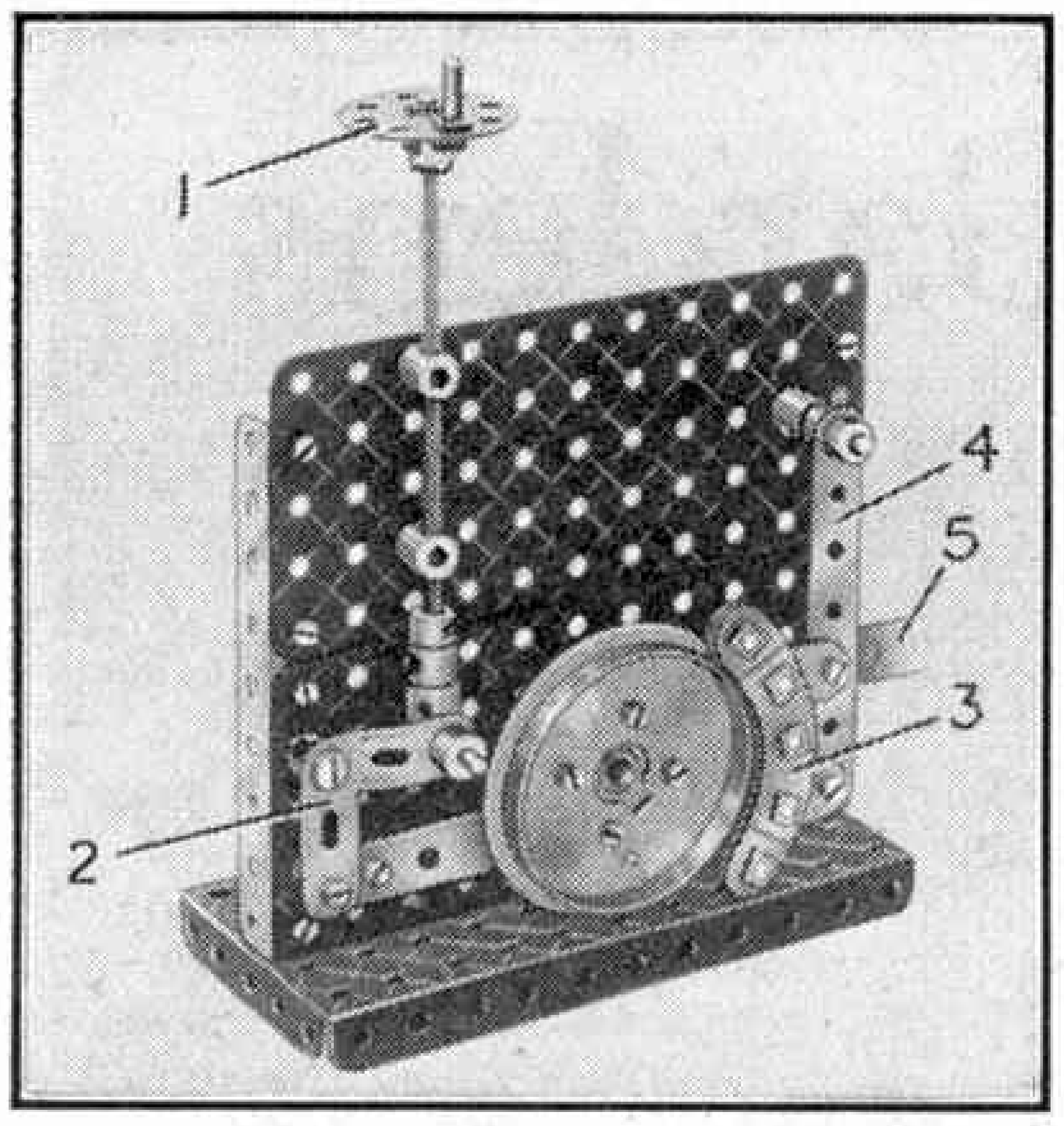


Fig. 4. Brake applied by turning a screw.

bolts to the shoe 2, in the manner shown. To each Corner Bracket of the shoe 2 is bolted a 2″ Strip, and between each pair of Strips are pivoted two Collars, one at each end. Similar parts are mounted pivotally on the shoe 1 and are connected to the corresponding Collars in the shoe 2 by means of short Rods.

The foot lever 4 comprises two 4½″ Strips joined at one end by a Double Bracket and also carrying two Collars between them. It is attached pivotally to a 2″ Rod, and the Collars are connected to those on the shoe 2 by further Rods as shown. Normally the brake shoes are held clear of the drum by their own weight, but when the foot pedal is depressed, the levers formed by the 2″ Strips are moved simultaneously and draw both shoes into contact with the drum.

This brake mechanism is particularly powerful and it is possible to lock the 3″ Pulleys with only a comparatively light pressure on the pedal.

Another form of external contracting brake, which is designed for use in cranes, is shown in Fig. 6. The main feature of this brake is that it is continually "on" and is released only when pressure is applied to the foot pedal by which it is operated. The brake band is a short length of Sprocket Chain passing round the rim of a Flanged Wheel forming the drum. One end of the Chain is fastened to a set screw screwed into a "spider," and the other end is fastened to the Rod 2. Weights consisting of 1″ Gears are mounted on the end of the Rod 2. The foot pedal by which the brake is released consists of a Rod and Strip Connector held on a short Rod fixed in the longitudinal bore of a Strip Coupling. The latter is pivoted on a 1″ Rod as shown, and is connected to the Rod 2 by a 1½″ Strip.

The brake band is normally held in tension by the weights acting on the arm, and is released by depressing the foot pedal when lifting or lowering has to be done.

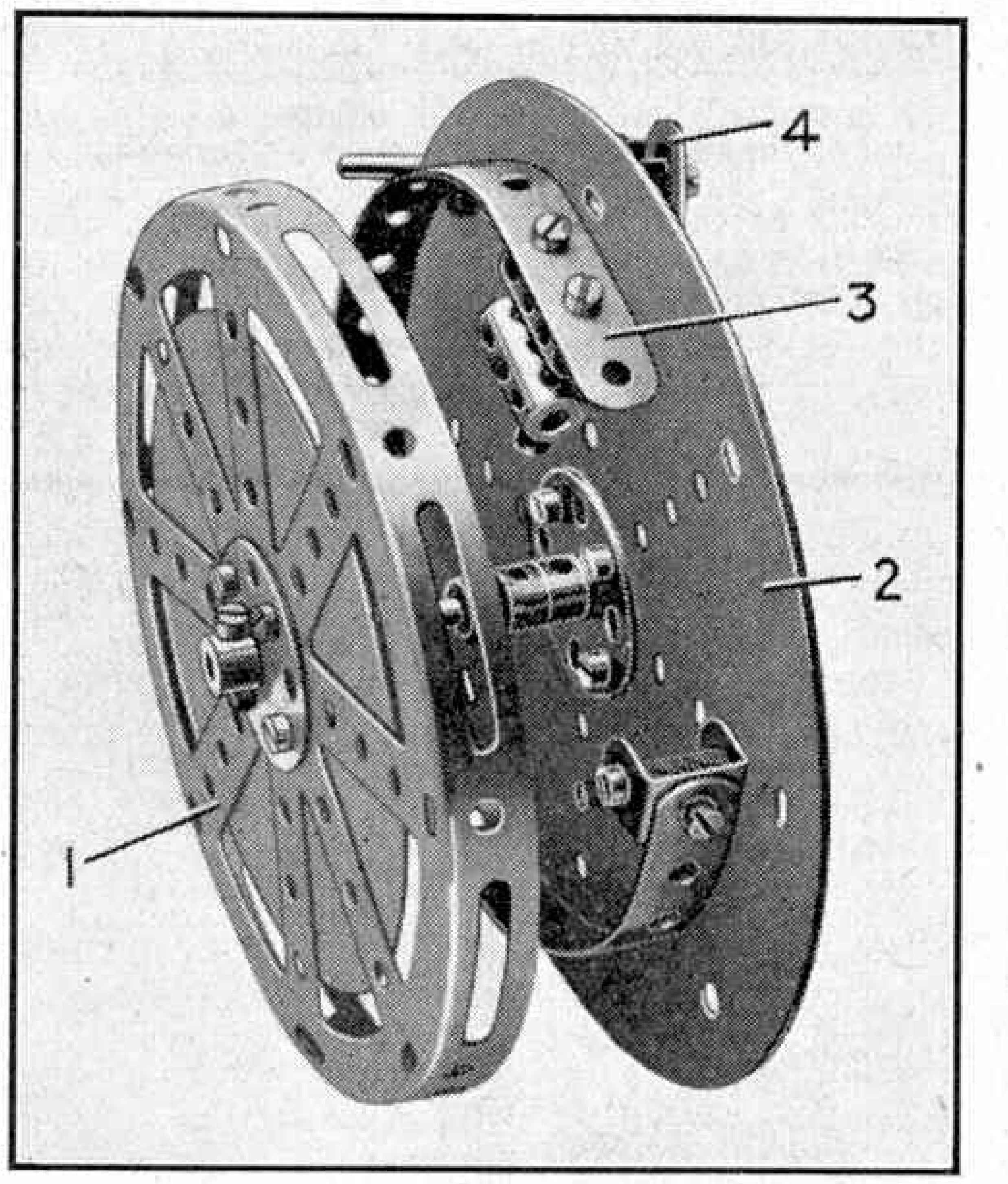


Fig. 5. Internal expanding brake with a single shoe.

External contracting brakes of a rather different type are those used in lift mechanisms. These generally are electrically operated and are applied to a drum on the winding shaft of the lift hoisting and lowering mechanism. While the current is switched on and the lift is in action, the shoes are held clear of the brake drum against powerful springs by electro-magnets. In the event of the electric supply being accidentally cut off, the brake comes into operation immediately, and prevents the lift from falling down the shaft.

Model-builders who are interested in the construction of detailed model locomotives and rolling stock will find it a good plan to incorporate brakes of the kind shown in Fig. 4. This brake is operated by a screw mechanism. The Bush Wheel 1 forms a handwheel, by means of which a Screwed Rod is made to rotate in the tapped holes of two fixed Rod Sockets, so that the Rod is either raised or lowered according to the direction in which it is rotated. At the lower end of the Screwed Rod is a Small Fork Piece that is pivotally connected to a Boss Bell Crank. This is joined by a link to the vertical Strip 4 that carries the brake shoe 3.

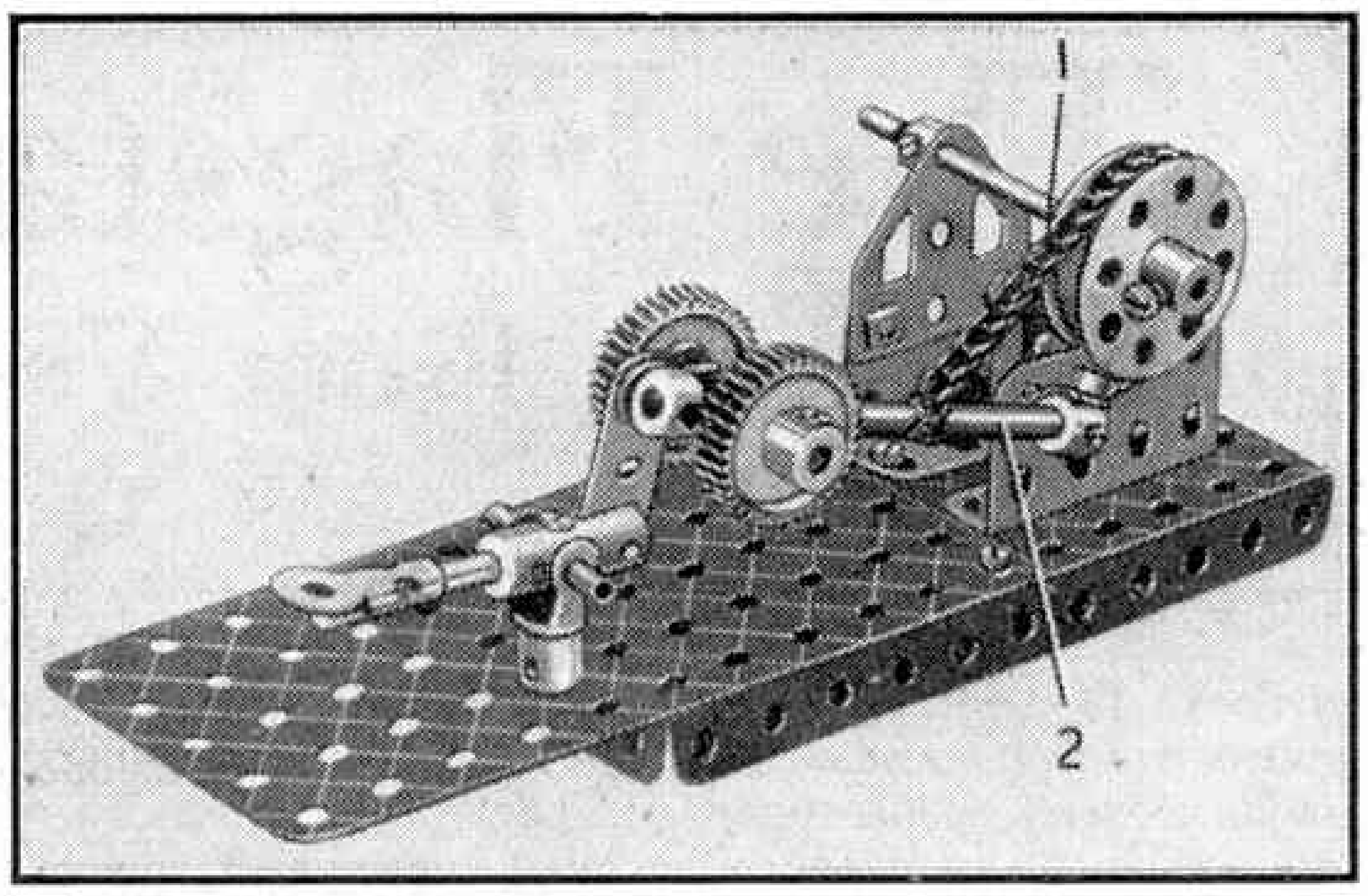


Fig. 6. A foot-operated strap brake for model cranes.

The arrangement shown is a complete mechanism for one wheel. A strip 5 forms a link that connects Strip 4 to the shoe-operating mechanism of the second wheel, so that both shoes engage with the wheel rims simultaneously. When incorporated into a model, the mechanism described would be fitted to both sides of the truck or van.

Another interesting type of brake is the electric slipper mechanism used on tramcars. This is quite easy to reproduce in Meccano and if added to a model tramcar will greatly increase the fun of operating it. It consists of a powerful electro-magnet with a pole of the same contour as the running rails. When the magnet is energised it is magnetically attracted into contact with the rail and retards the progress of the vehicle. Usually there are four shoes on a two-bogie tramcar, one shoe being placed between each pair of wheels. An interesting point about these brakes is the manner in which the current used to energise them is obtained. The driver first cuts off the current to the traction motor. Its armature is then rotated by the driving wheels of the tramcar, and owing to the special system of wiring adopted the motor then acts as a dynamo and generates the current to operate the brakes. This system is known technically as regenerative braking.

Many of the latest tramcars are fitted with a combined wheel and track brake, which is capable of stopping and holding a car on the steepest gradients. The essential parts of this system are the ordinary wheel brake blocks, magnetic track brake shoes, as already described, and a system of levers so arranged that when the shoes are drawn into contact with the rails the ordinary brake blocks are applied to the wheels.

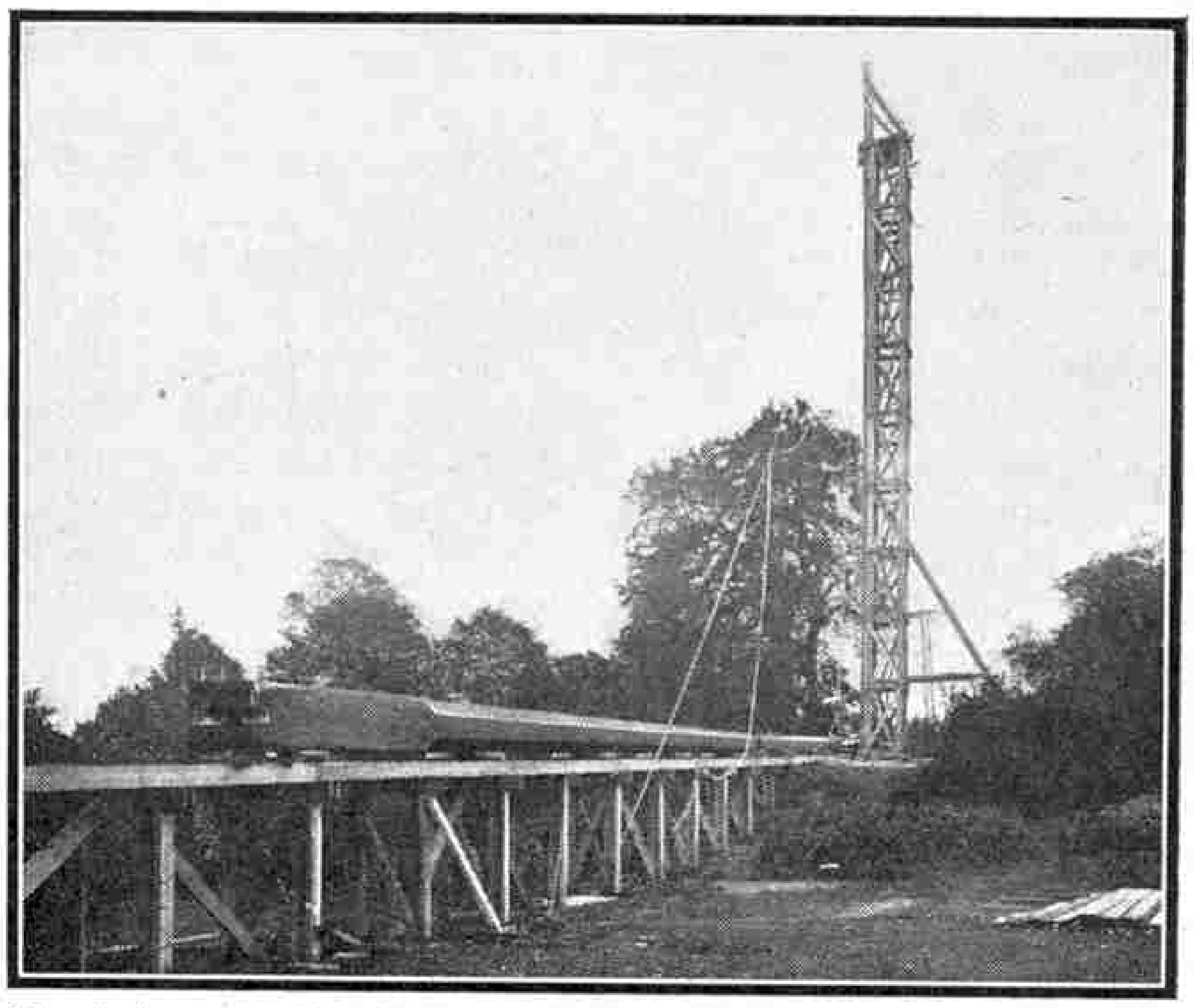
In a model the brake shoes can be built up from Strips bolted together, face to face, with a similar set of Strips joined to them at right-angles to form a T-shaped structure. Coil cheeks consisting of discs of cardboard are then fitted to the leg of the T, and several layers of No. 23 S.W.G. Cotton Covered Wire are wound between them. The shoe is then attached to the frame of the tramcar and small Compression Springs are arranged to hold it from the track when the current is switched off.

The Flagstaff at Kew Gardens

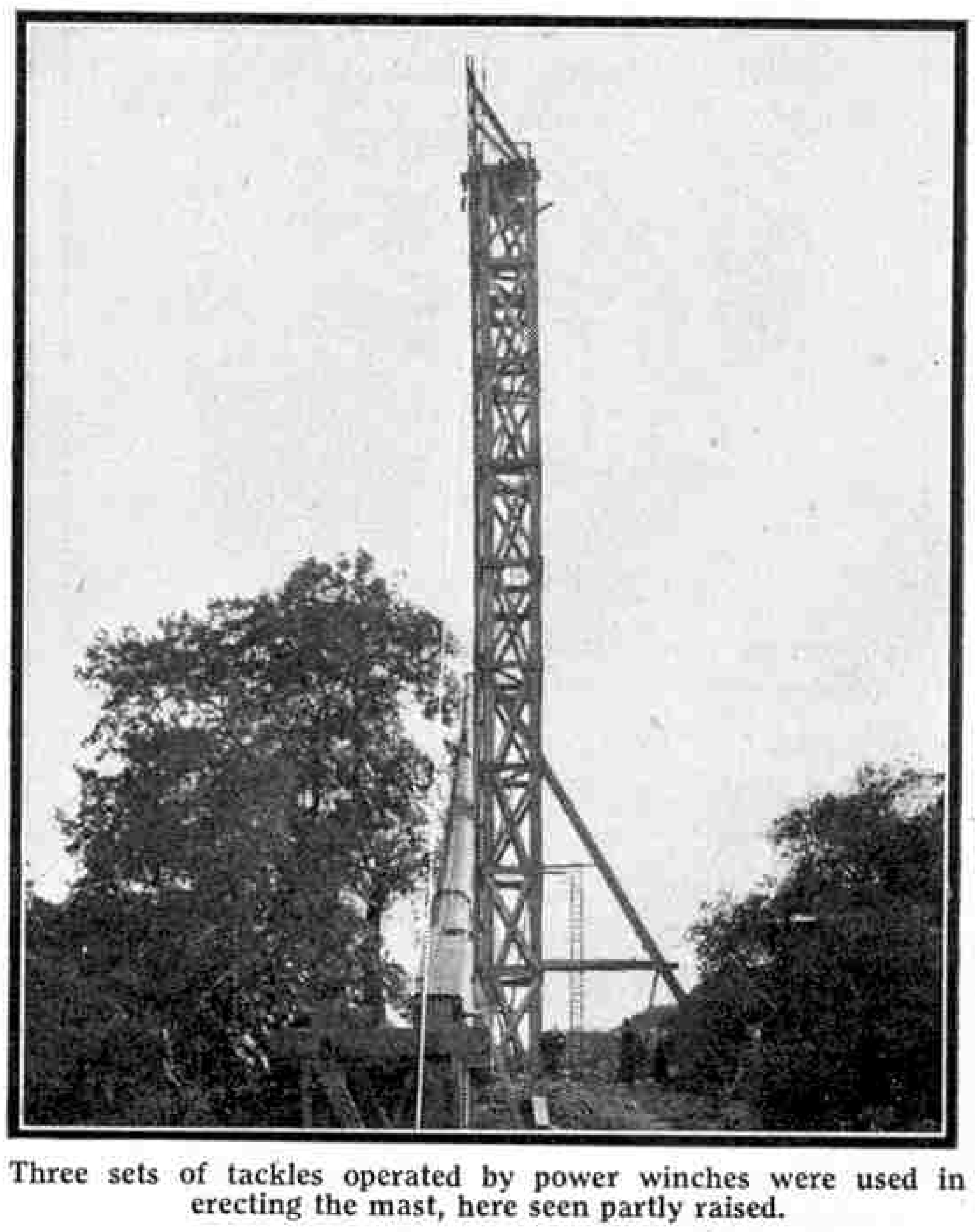
From Vancouver to the Thames

By Harold J. Shepstone, F.R.G.S.

IN these days of colossal engineering triumphs miniature achievements are apt to be overlooked; yet they are equally thrilling and just as worthy to be recorded. For instance, to be successful the work of the mast-builder is one that calls for daring ingenuity, as is evidenced in the erection of the famous flagstaff at Kew Gardens. This mast is a single spar, 214 ft. in length, the highest in this country and in Europe. It is exceeded in height only by one other flagstaff, that at Vancouver, in British Columbia, which tops the Kew giant by 6 ft., being 220 ft. in total height. Thus the British Empire can claim the distinction of possessing the highest flagstaffs in the world.


The giant mast at Kew Gardens in course of erection. The great butt has been fitted on the rolling platform, ready for pulling forward.

From beginning to end six years may be said to have been spent in securing this single spar. It was presented to the British nation by the Government of British Columbia, and is a magnificent example of the Douglas fir wood. One spring day a little band of skilled woodsmen entered one of the great fir forests, some thirty miles to the north of Vancouver, and began to scan the tall, green giants for one that could be converted into a flagstaff fit to adorn the Capital of the Empire, and from which the British flag could be flown proudly on State occasions. They halted finally before a magnificent company of guards that had remained inviolate against the beating of rains and lashings of winds for many centuries. A dozen fir trees towered above their brothers in isolated splendour. Here were the very trees they sought, all of the desired height, and as far as could be seen all were straight and true.


Three sets of tackles operated by power winches were used in erecting the mast, here seen partly raised.

One was felled, but unfortunately the top broke off as it crashed to the ground. Another giant was brought to earth, but on examination this was found to have a defect. A third was felled, but also failed to pass the critical test, and so it went on till eleven of the giants had been laid low, only to be discarded. But the twelfth tree was found to be perfect, and was accepted.

It was 220 ft. in length, 6 ft. in diameter at the larger end, and 18 in. inside the bark at the small end. Its branches were chopped away, it was loaded on a logging railway, and hauled ten miles to the salt water, where it was taken in tow by a tug and dragged through the dancing waves to Vancouver. There expert broadaxemen shaped it into a beautiful octagonal staff, rounded and gracefully tapering towards the top. After being finally hewed it had a total length of 214 ft., was 33 in. square at the butt, tapering to 12 in. at the top. For a distance of 15 ft. the great pole is a perfect square, continuing octagonal in shape for another 157 ft. when it emerges into a graceful circular spar.

The difficulty now was to find a vessel capable of carrying such a long piece of timber. Many captains said it was impossible to ship it whole, and suggested that it should be cut in two and spliced together again at the end of the journey. One captain did offer to carry it provided he be allowed slightly to bend the spar so as to make it fit the available deck space.

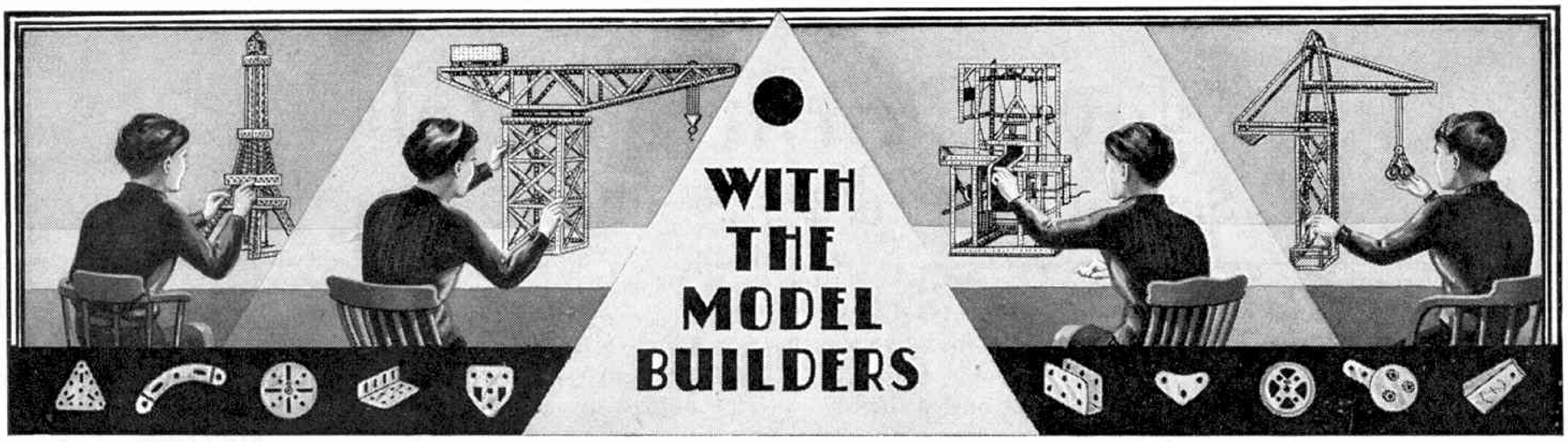
At last a ship was found capable of carrying it, and the mast was swung on board the steamer "*Merionethshire*" and brought to London, via the Suez Canal, travelling half-way round the world. Then just below London Bridge, the great flagstaff was tumbled off the deck into the river and towed up the Thames to Kew, where it was rolled ashore on a very high tide, and dragged through the gardens to the spot where it was decided to erect it. This task was entrusted to Messrs. Coubro and Scrutton, who have had considerable experience in erecting masts and wireless towers.

On account of its enormous length, its weight, and unique character its erection was no easy task. The least miscalculation or slip, and the giant flagstaff on which so much time and money had been expended would have been ruined. It had to be handled with the utmost care, and lifted evenly and quietly into position to prevent it from snapping or buckling. The wind pressure it would have to bear also had to be taken into consideration and allowed for. The site of its erection was a mound 20 ft. above the level of the surrounding lawns, closely surrounded on all sides by valuable trees.

Sheer-legs were first put up by which the upper portion of the mast was raised several feet from the ground, and under it a run-way was built on which the spar was moved forward by means of rollers. A strong derrick-tower 110 ft. in height was now built for raising it into an upright position. Before this operation was put in hand, however, the great spar was fitted with its necessary equipment—topmast, rigging-band, lightning-conductor, spike, and flag halyards, the last consisting of 2½-in. Manila ropes.

By means of three sets of tackles, operated by power winches, the flagstaff was gradually lifted into position. One set of ropes dragged the heel or base of the spar forward; another, fixed 100 ft. from the butt end, lifted the main weight of the mast; while the third, gripping the pole 40 ft. from the top end, raised its head and kept it evenly balanced.

The operation of sliding the heel or base of the spar into the special foundation that had been prepared for it was exceedingly delicate. Although towering 214 ft. in height, not more than a foot or so is buried beneath the mound. If the flagstaff had to stand by merely sinking it into the earth, it would have been necessary to lower it at least 20 ft. into the ground. But by dropping it into a concrete base, and firmly bolting it over iron blocks on each side, the necessary solidity is obtained. It means that no portion of the pole is embedded in earth, and it is impossible for it to rot by contact with the soil. It is further held in position by two sets of rigging, each having four stays, long steel wires running from the mast at an angle of forty-five degrees into the earth, where it is bolted to anchors set in concrete.



WITH THE MODEL BUILDERS

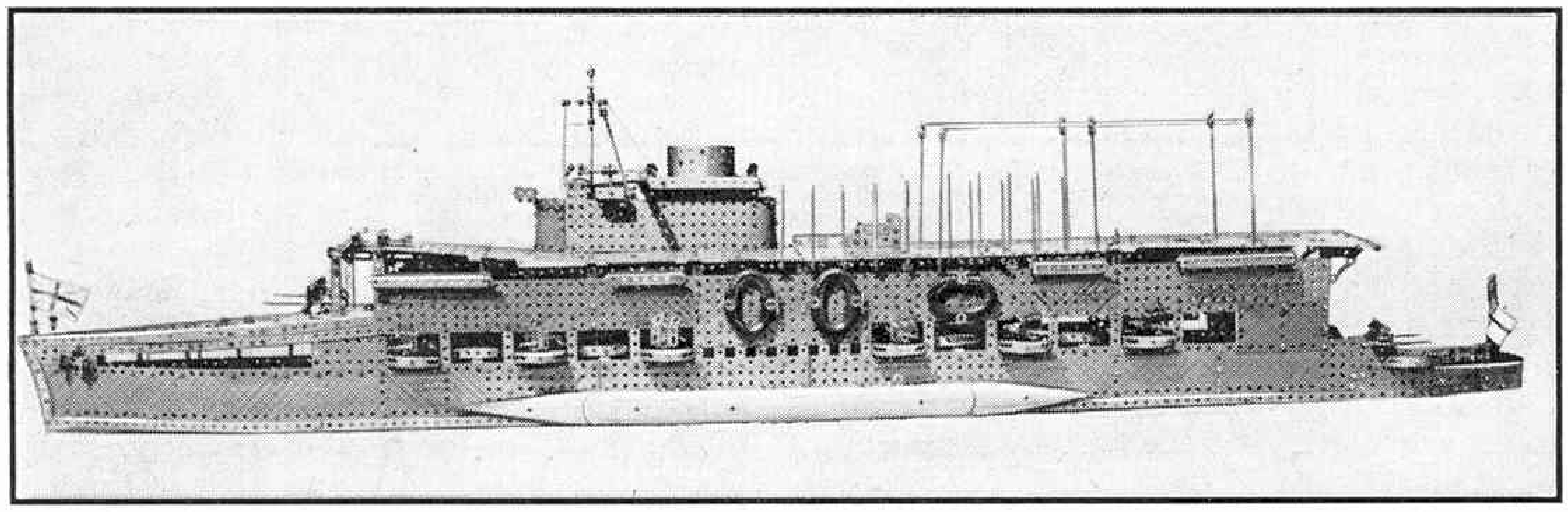
H.M.S. "COURAGEOUS" REPRODUCED IN MECCANO

The illustration on this page shows a cleverly-built model of the aircraft carrier H.M.S. "*Courageous*" constructed by L. Broadbridge, Tunbridge Wells, Kent. The model is approximately 6 ft. long and has a beam of 8 in. The construction of the hull is carried out mainly with Flat Plates, and Strip and Flexible Plates are used for the flight deck. The latter extends almost the complete length of the ship, and its end is sloped upward slightly. A lift operated by hand is provided in the hull for hoisting and lowering Dinky Toys Aeroplanes from the hangars to the flight deck.

The bridge and funnel are situated in a narrow "island" at one side of the flight deck, and just behind the bridge are two searchlights, the current for which is provided by batteries concealed in the hull. Switches are included in the circuit, so that the lights can be used for Morse signalling.

The actual vessel is fitted with 16 4.7 in. guns, and in the model these are represented by Rods, some of them being accommodated in turrets built into the sides of the hull, while others are mounted in deck turrets at the bow and stern.

An interesting feature of the model is that anti-torpedo bulges are fitted at each side of the hull. These are represented by Meccano Aeroplane Constructor parts fastened in position by Angle Brackets. In the real ship the bulges are placed so that they protect vital parts, such as ammunition stores, from torpedoes.



This fine model of the aircraft carrier H.M.S. "Courageous" was constructed by L. Broadbridge, Tunbridge Wells. It is fitted with a working lift, which hoists Dinky Toys Aeroplanes from the hangars to the flight deck.

A USEFUL BUILT-UP MECCANO CAM

A neat idea for a small cam that can be used effectively in Meccano models comes from D. Hurden, Harefield, Middlesex. The cam that Hurden suggests consists of a Collar, which is locked in the required position on a shaft by means of a 7/32" Grub Screw. A Rubber Tyre taken from a Dinky Toys motor car is then fitted over the Collar and Grub Screw. The projection of the tyre caused by the Grub Screw gives a lift of approximately ⅛".

A suitable contact roller for use with this cam can be made by fitting a Collar between the arms of a Fork Piece by means of a ⅜" Bolt. This unit is then mounted vertically above the cam.

A larger cam of similar type, but giving a lift of over ¼", can be made by fitting a 1" Rubber Ring around the flange of a ¾" Flanged Wheel. At one point a Collar is inserted between the flange and the ring to give the necessary projection. The contact roller already described can also be used successfully with this cam.

A MECCANO ELECTRIC HAND DRILL

A good example of the usefulness of Meccano parts in the home workshop is a practical hand drill designed and constructed by P. Le Fevre, Harleston.

The power unit of the drill is an E1 Electric Motor, and to the flanges of this a number of Strips are fastened by Angle Brackets to form a grip. Across the top of the Motor two 7½" Angle Girders are mounted by means of 2½"×½" Double Angle Strips and Flat Brackets. Two 1½"×½" Double Angle Strips bolted between the Angle Girders provide bearings for the drilling shaft, which is a 4½" Rod and at its rear end carries a ¾" Contrate Wheel that meshes with a ½" Pinion on a Rod journalled in the two 7½" Angle Girders. This Rod carries also a 1" Sprocket Wheel. The Sprocket Wheel is connected by a length of Sprocket Chain to a ¾" Sprocket on a shaft that is journalled in the side plates of the Motor. The Rod is driven from the Motor shaft through a 57-teeth Gear and Pinion. The drill chuck is a Coupling secured on the forward end of the drilling shaft.

A second grip, built up from three Double Angle Strips, is fastened by Angle Brackets under the 7½" Angle Girders, and on it is mounted a switch for controlling the current. The switch consists of a 2½" Strip that is cranked slightly at its centre, and is fastened to the handle by an insulated 6 B.A. Bolt. A Terminal is fitted on the shank of the Bolt and to it is attached one lead from the Transformer or accumulator. The second lead is connected to the insulated terminal of the Motor.

To start the drill, the current is switched on at the Transformer and pressure is then applied to the free end of the 2½" Strip so that it touches the handle of the drill and completes the electric circuit. The Motor is stopped by releasing the pressure on the Strip.

CRANKSHAFT CONSTRUCTION

Model-builders will be interested in a neat crankshaft for a small model steam engine devised by J. Wilston, Montreal, Canada. Each web of the crankshaft consists of three Flat Brackets, which are placed so that the holes in them coincide and are then pressed into the grooves of an Eye Piece, with the ends bearing round holes protruding. The crank-pin is formed by a short Screwed Rod, which is lock-nutted to the free ends of the Flat Bracket. The Screwed Rod carries at its centre a Coupling, in the longitudinal bore of which the connecting rod is locked.

A larger crankshaft of this type can be made by replacing the Flat Brackets with 1½" or 2" Strips. As the Strips are thicker than Flat Brackets, only two will be needed to form each web.

A strong and realistic crankshaft for a large horizontal engine can be built up by using two 2½" Triangular Plates for the webs. Each of these is fastened to a Rod by means of a Crank, and the two are joined together by a crank-pin consisting of a 2" Rod. The crank-pin passes through one corner of each Triangular Plate and is fixed in position by Collars. A large Fork Piece forms a suitable "big end" for a crankshaft of this type. Flat Trunnions fastened to Rods by Double Arm Cranks can be used instead of Triangular Plates to make a smaller crankshaft.

A NOVEL MOMENTUM DRIVE

S. Jarvis, Southsea, built a demonstration model pithead gear, driven by a Clockwork Motor, and cleverly avoided having to stop the model periodically in order to rewind the Motor. With this in view he fitted two Meccano Flywheels on a Rod journalled in the sideplates of the Motor, and connected this Rod to one of the driven rods of the model through step-up gearing. He then arranged matters so that when the Motor was nearly run down, the pinion on its driving shaft could be thrown out of gear with the mechanism simply by pushing over a lever. The momentum of the two Flywheels was sufficient to keep the model running for the short time necessary to rewind the Motor and to put it in gear again.

A BUILT-UP PAWL

A neat built-up pawl that will be found useful in models where there is insufficient space to permit the use of a standard Pawl is suggested by R. Peters, London. A "spider" taken from a Universal Coupling is pivoted to a Girder or Strip in the next hole to the Ratchet Wheel by means of a bolt screwed into one of its tapped holes and locked in place by a nut. A ½" Bolt is then screwed through the transverse tapped holes, so that its protruding shank engages the teeth of the Ratchet. A length of Spring Cord can be used for holding the pawl in place, the end of the Cord being looped and inserted under the head of the ½" Bolt.

A NEW ZEALAND READER'S EXHIBITION MODEL

L. Edwards, Auckland, New Zealand, recently forwarded details of a model engineering workshop with which he won a prize in an Exhibition in Auckland. The model possesses several novel features. It comprises various machine tools and other workshop equipment, such as grindstones, forge and an anvil at which a workman is hammering. All these items are realistically constructed and are driven from overhead shafting through Sprocket Chain and belts. Power is supplied by two 6-volt Electric Motors, which are coupled together through a special differential gear and operated by remote control, and each machine is fitted with a fast and loose pulley belt change mechanism so that it can be started or stopped without interfering with the main drive.

The machines are mounted on a wooden baseboard surrounded by a railing of Braced Girders and Angle Girders, and when in action are floodlit by small electric lamps concealed under the roof.

ELECTRO-MAGNET CONSTRUCTION

From time to time we receive enquiries from model-builders who wish to make electro-magnets for operating model railway points, gear-boxes, clocks and other mechanisms by remote control. There appears to be a considerable demand for electro-magnets for these and similar purposes, and many model-builders seem to be unaware of the use of the Meccano Bobbin (Part No. 181) in this respect.

The Bobbin is intended specially for the use of model-builders who wish to wind their own solenoids and consists of a hollow brass tube of slightly larger diameter than a Meccano Rod, fitted at each end with a circular fibre cheek. A good solenoid can be made by winding a Bobbin to capacity with No. 23 S.W.G. S.C.C. Copper Wire. If the solenoids are required to operate for long periods, as, for example, when they are used in synchronous motors, it is advisable to connect from four to six of them in the circuit in order to prevent overheating, and they should be wired together in series.

A solenoid for intermittent use as in a relay mechanism can be wound with three layers of No. 26 S.W.G. Cotton Covered Copper Wire.

When very small electro-magnets are required the best plan is to fit a Pivot Bolt with cardboard cheeks, and then wind on the Bolt a few layers of No. 26 or No. 28 S.W.G. Cotton Covered Copper Wire. Small magnets of this kind will be found particularly suitable for use in remotely controlled models as they occupy very little space.

Model-builders who require more powerful electro-magnets than those described should use Elektron Magnet Coils (Elektron Part No. 1538).

New Outfit Models

Special Subjects for Smaller Outfits

THIS month we have chosen four unusually interesting models for illustration and description. Two of these are simple but very realistic models for owners of small Outfits. They are a mobile searchlight unit and a lifting platform truck, both of which can be built from Outfit No. 2. The others are a novel aeroplane roundabout with a fascinating movement and a model Hawker "Hurricane" monoplane, which are slightly more elaborate and require Outfits Nos. 5 and 6 respectively for their construction.

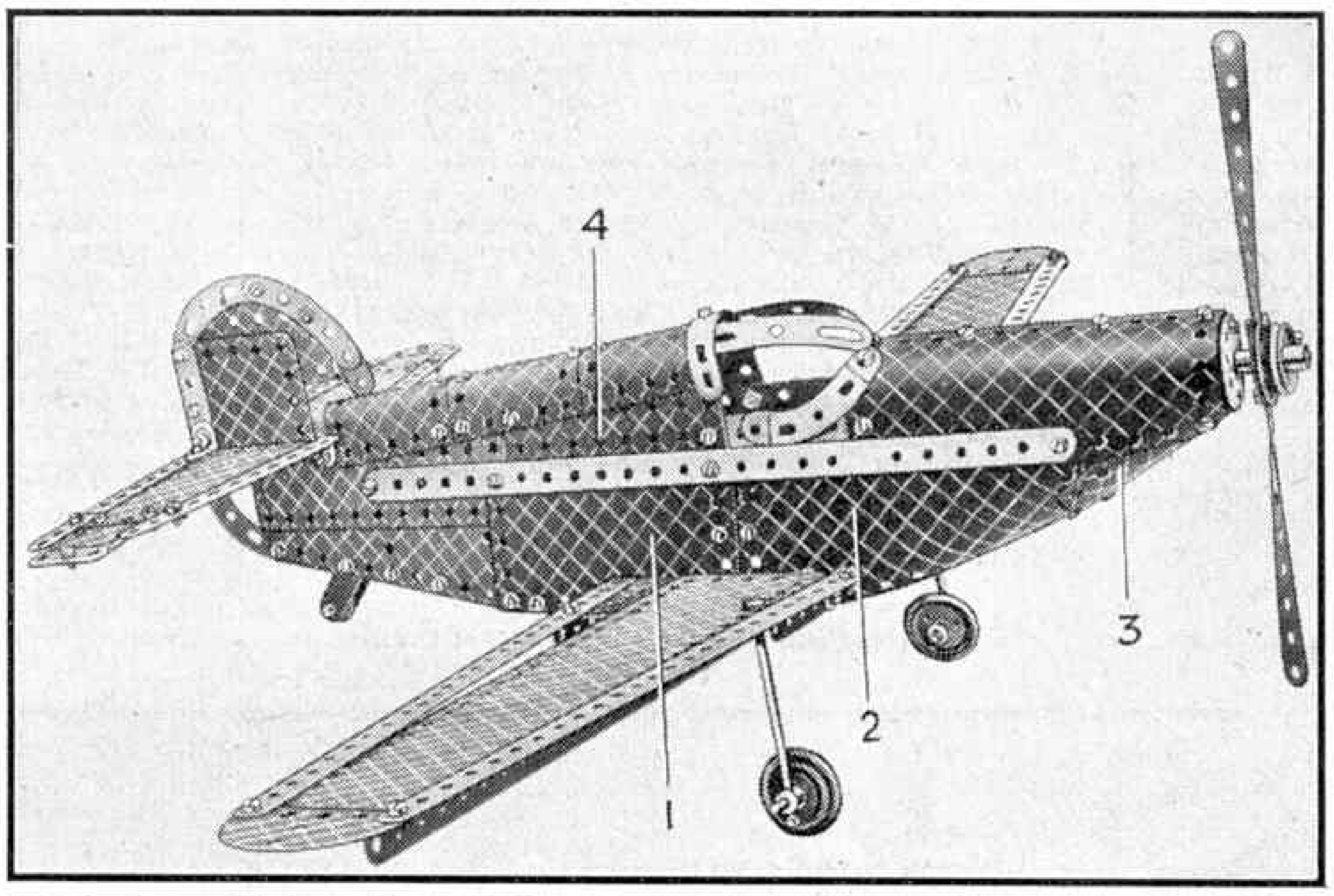


Fig. 1. The realistic outline of this model Hawker "Hurricane" monoplane is obtained mainly by the use of Flexible Plates. The model is built from Outfit No. 6.

The aeroplane roundabout is shown in Fig. 4. It comprises an aeroplane pivotally attached to the end of a radial beam supported by a central tower, the beam being rotated by an Electric Motor. When the Motor is set in motion the aeroplane circles at a gradually increasing speed around the tower and rises slowly from the ground.

Construction of the model is commenced with the base of the tower, the details of which are shown in the illustration. The four 12½″ Angle Girders that form the corners of the tower are fastened to the base by means of Obtuse Angle Brackets. At their upper ends the Angle Girders are bolted to a 2½″ × 1½″ Flanged Plate.

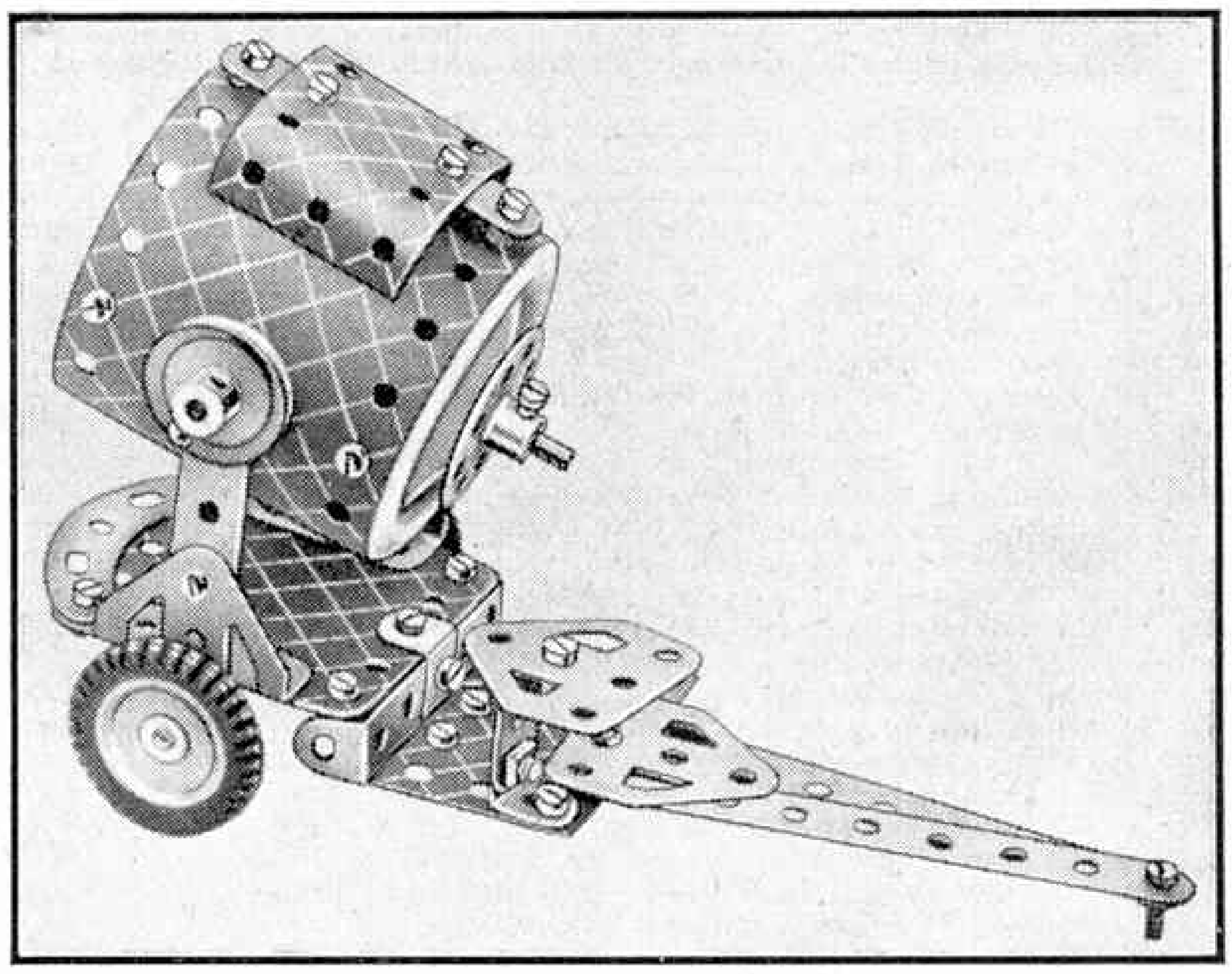


Fig. 2. A mobile searchlight unit, which can be constructed from the parts in Outfit No. 2.

Fitted inside the lower portion of the tower is an E1 or E120 Electric Motor that forms the power unit. The Motor is secured at one end of a 5½″ × 2½″ Flanged Plate by bolts passed through its flanges, and its driving shaft is connected by a 2½″ Driving Band to a 1″ Pulley on the 3½″ Rod 1. This Rod is journalled in a 2½″ × ½″ Double Angle Strip supported from the Flanged Plate by two Reversed Angle Brackets, and it is connected by a 6″ Driving Band to a 1″ Pulley 2 on the centre shaft. The Driving Band also passes around two 1″ loose Pulleys on a 4″ Rod that revolves in Reversed Angle Brackets bolted to two corners of the tower.

The central shaft is a compound rod consisting of a 4½″ and a 5½″ Rod joined by a Rod Connector. Two Spring Clips pressed on to the Rod Connector ensure that the Rods are gripped securely. At its upper end this shaft carries a 3″ Pulley, on the upper surface of which two 2½″ Strips are mounted by means of Trunnions. A 1″ Rod journalled in the upper end holes of these Strips provides the support for the radial beam, at the ends of which the aeroplane and counterbalance are attached.

The beam itself consists of four 12½″ Strips placed face to face, and at one end it carries a counterbalance consisting of six 12½″ Strips and two Flanged Sector Plates, which are attached to it by two ½″ Bolts. A 3½″ Rod passed through the two Sector Plates carries also four Road Wheels, four 2½″ Strips, four Curved Strips and four 1¼″ Discs as an extra weight.

The constructional details of the aeroplane are quite simple. The fuselage consists of four 5½″ Strips extended by four 2½″ Strips. The nose of the machine is a Bush Wheel fixed to one of the 2½″ Strips by a 1″ × 1″ Angle Bracket. Two 5½″ × 1½″ Flexible Plates, braced by 5½″ Strips are used for the wings.

The upper and lower wings are connected by a 3″ Screwed Rod, and the upper one is attached by a ⅜″ Bolt to the centre of the Double Angle Strip joining the sides of the fuselage. The Screwed Rod supports also the undercarriage, which consists of a 2½″ × ½″ Double Angle Strip, the landing wheels being ¾″ Discs loosely fastened to the latter part by lock-nutted bolts. The tail unit is built up from a Semi-Circular Plate and a Flat Trunnion. The aeroplane is pivotally attached to the longer arm of the beam by a Cranked Bent Strip and a lock-nutted bolt as shown in Fig. 4.

Parts required to build model roundabout: 10 of No. 1; 11 of No. 2; 2 of No. 3; 12 of No. 5; 4 of No. 8; 7 of No. 10; 10 of No. 12; 1 of No. 12a; 4 of No. 12c; 1 of No. 15; 1 of No. 15a; 1 of No. 15b; 2 of No. 16; 1 of No. 18b; 1 of No. 19b; 3 of No. 22; 2 of No. 22a; 1 of No. 24; 5 of No. 35; 88 of No. 37a; 77 of No. 37b; 14 of No. 38; 1 of No. 44; 1 of No. 48; 1 of No. 48a; 1 of No. 51; 1 of No. 52; 2 of No. 54a; 1 of No. 80c; 4 of No. 90a; 2 of No. 111a; 5 of No. 111c; 4 of No. 125; 2 of No. 126; 1 of No. 126a; 1 of No. 186; 1 of No. 186a; 4 of No. 187; 2 of No. 189; 2 of No. 191; 4 of No. 192; 1 of No. 198; 2 of No. 213; 1 of No. 214; 4 of No. 217a; 2 of No. 217b; 1 E120 Electric Motor (not included in Outfit).

An Outfit No. 6 is required for the construction of the realistic model of a Hawker "Hurricane" monoplane shown in Fig. 1. The "Hurricane" is a particularly interesting subject in view of the recent fine accomplishment of 11 of these machines in flying from Northolt to Le Bourget in 55 minutes. Construction of the model is commenced with the fuselage, each side of which is built up by joining a 4½"×2½" Flexible Plate 1 to a 5½"×2½" Flexible Plate 2 by means of a 12½" Strip. The forward end of each of the larger Flexible Plates is then bent inwards and the two are bolted together. The nose is formed by two more 5½"×2½" Flexible Plates. The underside of the nose is closed in by a $1\frac{11}{16}$" radius Curved Plate 3.

The centre part of the fuselage is next built up by fastening two Flanged Sector Plates 4 in position. These are then extended to the rear on each side by two 5½"×1½" Flexible Plates, which are bolted together at the tail. The bolt used for this purpose serves also to hold the rudder in position, and this should now be assembled. It consists of a framework of 2½" Strips and Curved Strips filled in by a 2½"×1½" and a 2½"×2½" Flexible Plate.

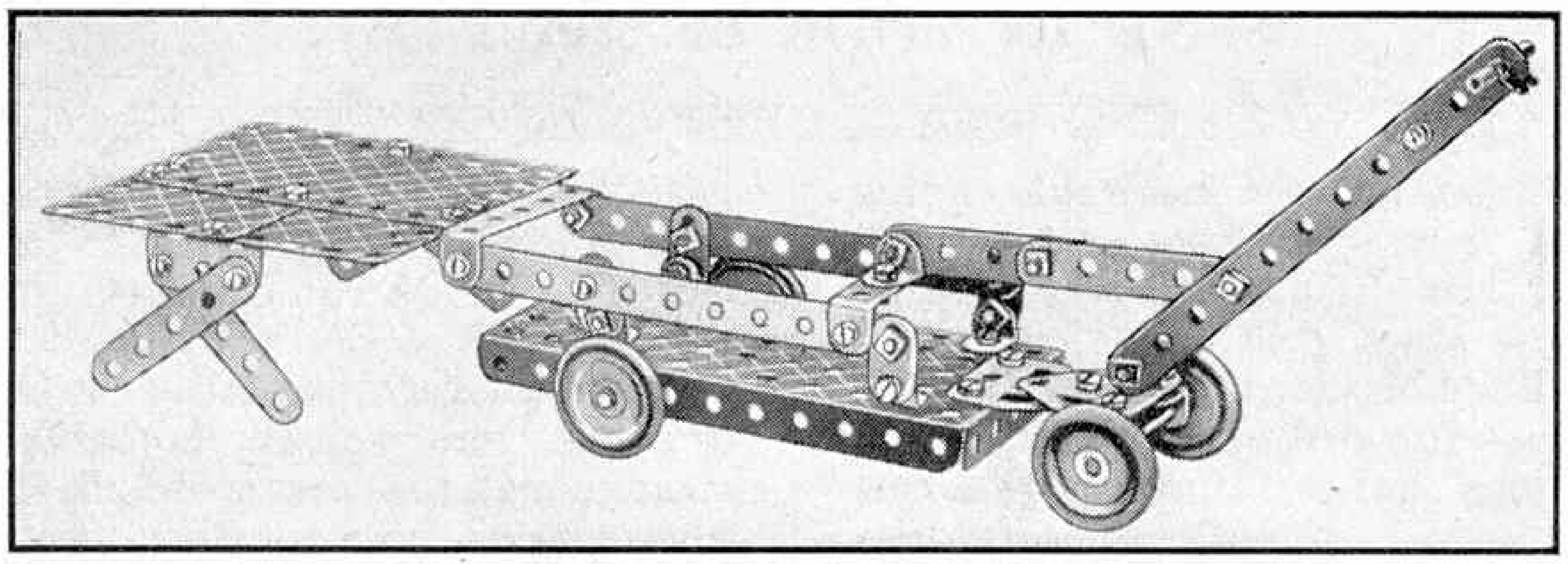


Fig. 3. Another novel subject for Outfit No. 2. This model lifting truck is based on an actual truck used in factories for transporting goods from one department to another.

The inner lower edges of the Plates used in the construction of the fuselage are strengthened by 5½" Strips, and the sides are spaced apart by two 2½"×½" and one 1½"×½" Double Angle Strip to give correct shape.

To make the tail plane the centre pin is removed from a Hinged Flat Plate, the two parts of which are used separately. Each half is extended by a 2½"×1½" Flexible Plate, and is braced at the edges by two 5½" and one 1½" Strip. The two are then fastened to the fuselage and to the rear end of the rudder by Angle Brackets.

Each wing is constructed from a 12½" Strip Plate that is braced along its underside by a 12½" Angle Girder. The Strip Plate is bolted to a 3½"×2½" Flanged Plate attached to the fuselage side by a 3½"×½" Double Angle Strip.

The landing wheel units comprise a 1" loose Pulley with Rubber Ring mounted on a 1½" Rod between a Collar and a 1" fast Pulley. The fast Pulley is locked on the Rod, and a 3" Screwed Rod is then screwed into one of the tapped holes in its boss, the upper end of the Screwed Rod being fastened by lock-nuts to the wing.

Two 5½" Strips bolted between two 1¼" Discs are used for the propeller, which revolves on a 3½" Rod supported in the Bush Wheel at the nose. The Bush Wheel is fixed in place by an Angle Bracket.

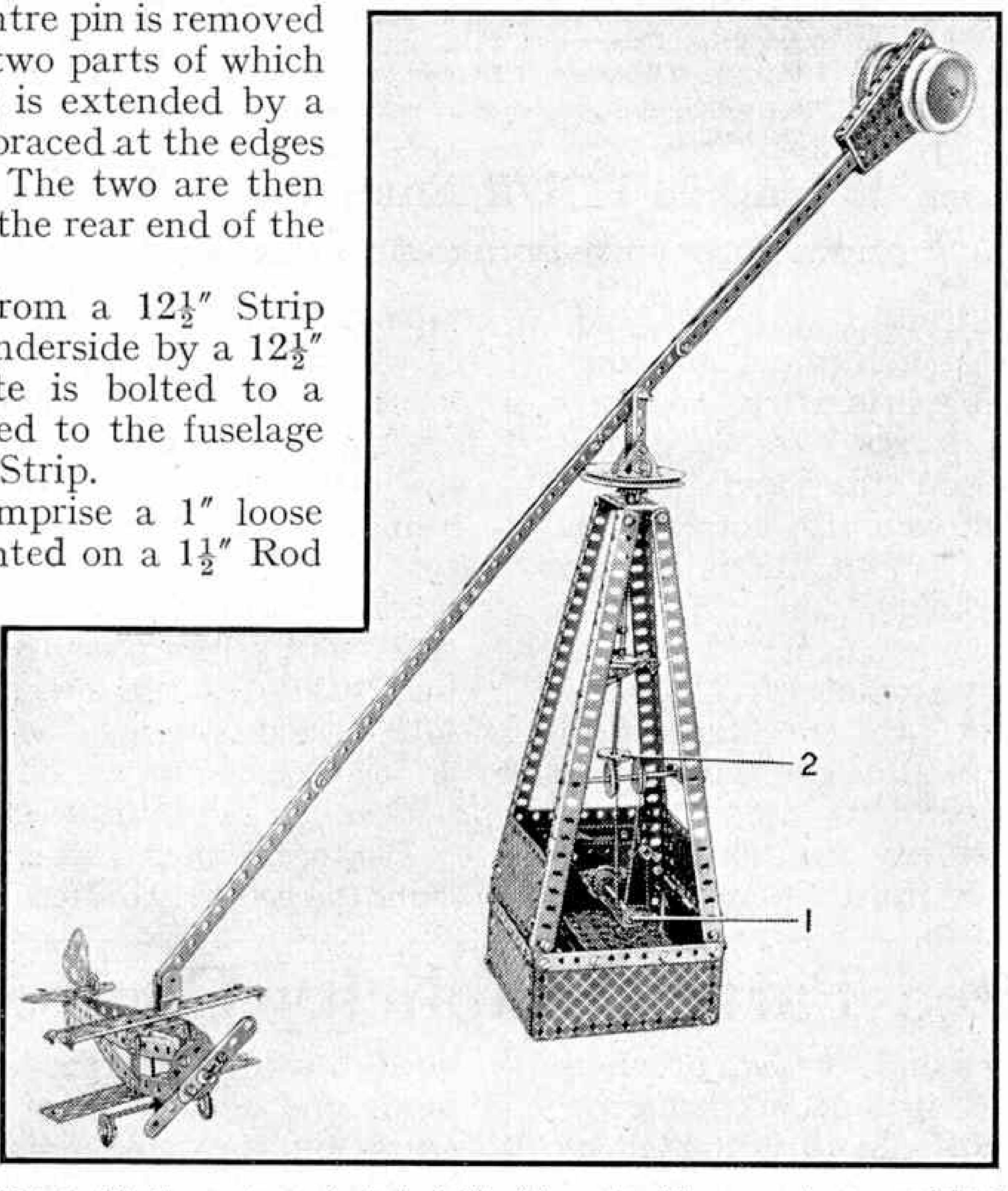


Fig. 4. All the parts required to build this motor-driven aeroplane roundabout are contained in Outfit No. 5.

Parts required to build Hawker "Hurricane": 8 of No. 1; 14 of No. 2; 2 of No. 3; 4 of No. 5; 2 of No. 8; 1 of No. 11; 9 of No. 12; 1 of No. 16; 2 of No. 18a; 3 of No. 22; 2 of No. 22a; 1 of No. 24; 104 of No. 37a; 99 of No. 37b; 3 of No. 38; 1 of No. 44; 1 of No. 48; 2 of No. 48a; 2 of No. 48b; 2 of No. 53; 2 of No. 54a; 4 of No. 59; 2 of No. 80c; 2 of No. 90; 4 of No. 90a; 1 of No. 111c; 2 of No. 155a; 1 of No. 188; 4 of No. 189; 1 of No. 190; 2 of No. 191; 4 of No. 192; 2 of No. 197; 1 of No. 198; 2 of No. 199; 2 of No. 200; 2 of No. 214; 3 of No. 215; 2 of No. 217a.

Fig. 3 shows a model of a popular type of truck used in factories for transporting goods from one department to another. The goods to be moved are stacked on a tray raised from the ground on runners. The truck is then pushed under the tray and the handle shaft is pressed downward. This movement causes the lifting platform of the truck to rise and lift the tray of goods ready for transportation. When the goods have been conveyed to the desired place, the truck handle shaft is raised and the tray and goods deposited on the ground. The truck is then withdrawn and is ready for another load.

All these movements can be reproduced with the model, the main frame of which consists of a 5½"×2½" Flanged Plate. A 3½" Rod journalled in the flanges of the Plate carries two 1" Pulleys fitted with Rubber Rings, and a Flat Trunnion is bolted to the forward end to provide a support for a second Flat Trunnion, which is secured to it by a lock-nutted bolt. Angle Brackets bolted to the underside of the second Flat Trunnion form the bearings for the front axle, one of the bolts holding also an Angle Bracket above the Flat Trunnion. The latter forms the point of attachment for the shaft of the handle, which consists of two 5½" Strips bolted together and spaced apart by a nut on each bolt.

The frame of the lifting platform is built up by joining two 5½" Strips together by two 2½"×½" Double Angle Strips. Four Flat Brackets are lock-nutted to the 5½" Strips in the positions shown, and the other ends of the Flat Brackets are lock-nutted to four Angle Brackets bolted to the 5½"×2½" Flanged Plate. The Flat Brackets must be free to move easily. The forward 2½"×½" Double Angle Strip of the lifting platform is linked by a compound strip to the handle, the strip consisting of two 2½" Strips overlapping two holes.

Parts required to build the model lifting platform truck: 4 of No. 2; 6 of No. 5; 4 of No. 10; 7 of No. 12; 1 of No. 16; 2 of No. 17; 4 of No. 22; 2 of No. 35; 46 of No. 47a; 31 of No. 37b; 2 of No. 48a; 1 of No. 52; 2 of No. 126; 2 of No. 126a; 4 of No. 155a; 2 of No. 190; 1 of No. 191.

Owners of an Outfit No. 2, or indeed of any Outfit of greater size than this, have another good subject for their attention in the novel mobile searchlight unit shown in Fig. 2. The lamp housing is made by bolting a 4½"×2½" Flexible Plate and a $1\frac{11}{16}$" radius Curved Plate together to form a cylinder. A Road Wheel carrying a 2" Rod in its boss is then pushed into the end of this structure, and a Bush Wheel also is fastened to the 2" Rod, but outside the Road Wheel. A 2½"×1½" Flexible Plate, the ends of which are curved downwards, is mounted on top of the searchlight by a 2½" Strip and two ⅜" Bolts.

Parts required to build model searchlight: 2 of No. 2; 5 of No. 5; 2 of No. 12; 2 of No. 16; 1 of No. 17; 3 of No. 22; 1 of No. 24; 3 of No. 35; 28 of No. 37a; 28 of No. 37b; 4 of No. 38; 1 of No. 48a; 1 of No. 90a; 3 of No. 111c; 2 of No. 126; 2 of No. 126a; 2 of No. 188; 2 of No. 190; 1 of No. 191; 2 1" Rubber Tyres (not included in Outfit).

A Fine Competition for all Meccano Boys

Valuable Cash Prizes—Extended Closing Date

SEND IN YOUR ENTRY NOW!

With the coming of October and the inevitable ending of most outdoor pastimes, thousands of boys return with renewed enthusiasm to their Meccano model-building activities, for they know from past experience that Meccano is the finest of all hobbies for the winter months. Most of these boys also look forward to competing in the model-building competitions that are announced on this page each month, and which provide opportunities for winning valuable prizes.

This season we want every owner of a Meccano Outfit, no matter how small, to become a regular competitor. There is really no reason why every boy should not do so, for there is nothing whatever to pay and no troublesome entry forms to fill up. The competitions are open to model-builders of any age, and they are arranged so that no matter how young a boy may be or how small his Outfit, he will stand just as good a chance of winning the biggest prizes as older competitors with large Outfits at their disposal. We hope, therefore, that everyone who has not yet taken part in any of the *"M.M."* competitions will decide to send in entries for each contest announced.

"Autumn" Model-Building Competition

Closing Date: 31st December

FINE CASH PRIZES YOU CAN WIN

First Prize, Cheque for £5/5/–.
Second Prize, Cheque for £3/3/–.
Third Prize, Cheque for £2/2/–.
Ten Prizes of Meccano or Hornby goods value 10/6.
There will be also consolation awards and Certificates of Merit.

Send in *YOUR* Entry Now!

This month we give details of the first important competition of the season, and wish particularly to draw attention to the splendid cash prizes offered. A full list of these appears in the panel on this page.

For the benefit of those readers who are not familiar with the rules governing *"M.M."* competitions we are giving all details as fully as possible.

The competition is what is known as a general one, that is, models entered may be of any kind whatever. Models of ships, bridges, locomotives, motor cars, machines of all kinds and any other subjects competitors can think of are all suitable for entry in this competition. Competitors may use any size of Meccano Outfit or any number of parts in building their models, but they must assemble them entirely without aid from others. There is no age limit and Meccano users living in any part of the world can compete on equal terms.

When the model is built all that is necessary is to obtain a photograph of it or, if this is not possible, a good drawing. Quite a small photograph will do, provided it is clear enough to show the details of the model, and neither photographs nor drawings need be prepared by the competitor himself.

The competitor should then write his name, age and full address on the back of the photograph or drawing and enclose it, together with a brief description of the model, in an envelope addressed *"Autumn Model-Building Competition,"* Meccano Ltd., Binns Road, Liverpool 13.

Entries must be posted in time to reach this office not later than 31st December. Any entries received after that date will be held over for the next suitable competition.

In preparing their models competitors are advised to bear in mind the following points. The prizes will be awarded to the senders of the models in which the best use is made of the Meccano parts of which they are built. Good sturdy construction, neat workmanship and the choice of a really interesting subject are the other main characteristics that are required in a model in order to win a prize. It will be seen therefore that a small model, skilfully designed and well-built, will stand just as good a chance of success as the largest and most intricate structure. This system of judging ensures fair treatment for each competitor, irrespective of the size of his Outfit. The age of each competitor also will be taken into consideration in assessing the merits of his work, so that the youngest boys can compete on equal terms with older and more experienced model-builders.

Photographs or drawings of models that win prizes become the property of Meccano Ltd., and will not be returned.

"Limited Parts" Simplicity Competition

This month's competition differs slightly from previous simplicity contests. In past competitions of this type, competitors were allowed to include in their models as many Meccano parts as they wished, but in the present contest models must be built with not more than 10 parts, excluding nuts and bolts. Any kind of parts may be used, however, and models may represent any type of subject. The main things the judges will look for when awarding the prizes will be realism and novelty of subject. The Meccano parts used must not be bent or otherwise mutilated, and it should be clearly understood that the specified number of parts, 10, does not include nuts and bolts, any number of which may be used according to requirements.

The actual model must not be sent; a photograph or a good drawing is all that is required. The competitor's age, name and address must be written on the back of the entry, and the number of parts contained in the model also must be stated. Entries should be addressed to *"Limited Parts Simplicity Contest,"* Meccano Ltd., Binns Road, Liverpool 13. Entries will be divided into two Sections, A, for competitors living in the British Isles, and B, for those living Overseas. Entries for Section A must be posted in time to reach Liverpool before 31st October, 1938. Section B will remain open for entries until 31st December, 1938.

The prizes to be awarded in each Section are as follows: First, Meccano or Hornby products value £2/2/–. Second, products value £1/1/–. Third, products value 10/6. Ten prizes of products value 5/–.

Model-Building Competition Results

By "Spanner"

"Aircraft" Contest (Overseas Section)

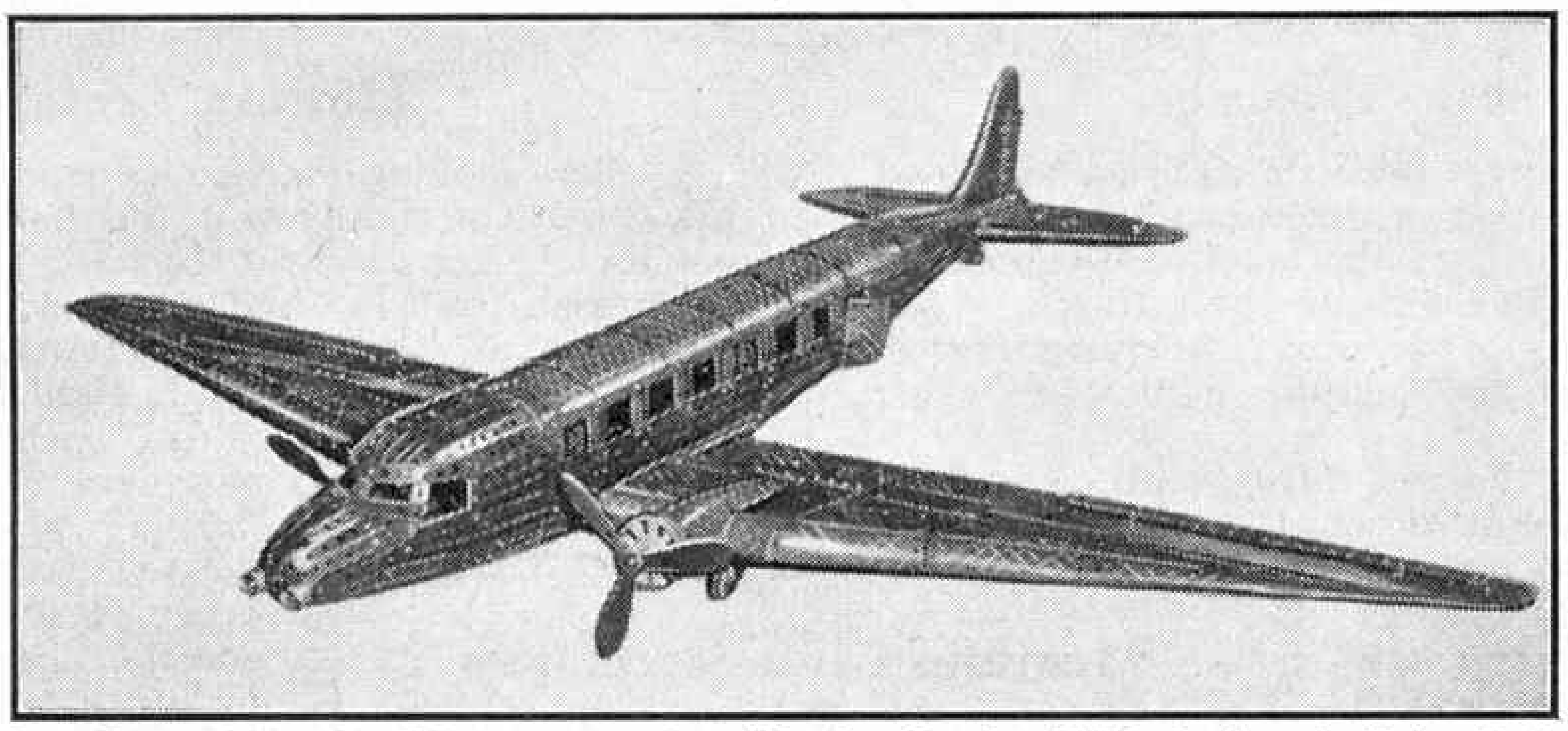
It is evident from the large number of entries received in the "Aircraft" Competition that model-building of this type appeals to Meccano users. Almost every kind of aeroplane is represented among the splendid models submitted, and it was by no means an easy matter to decide which were the best. In view of the great success of this Contest we shall organise further similar competitions in due course.

The principal prizes have been awarded as follows:

1st Prize, Meccano or Hornby products value £3/3/-: F. Trasler, Stoneypoint, Canada. 2nd, products value £2/2/-: P. Giese, Buenos Aires. 3rd, products value £1/1/-: D. J. Hofsommer, The Hague, Holland.

Products value 10/6: P. Gilles, Montpellier, France; G. Wilkinson, Durban, S. Africa; C. J. Mallia, Pawla, Malta; J. Giese, Buenos Aires; A. Chemaly, Dewetsdorp, S. Africa.

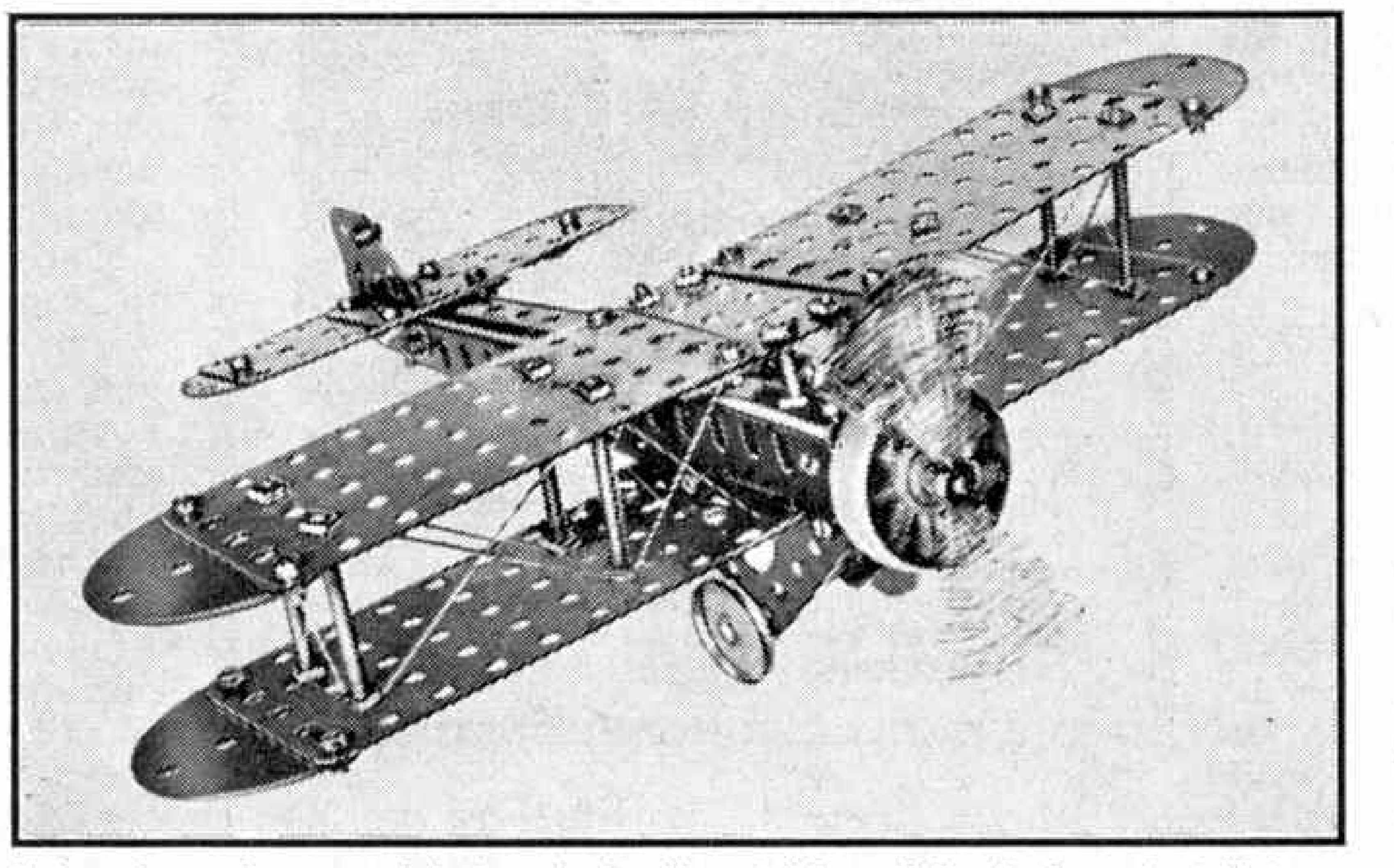
Products value 5/-: N. Candish, Opawa, New Zealand; D. Macey, Plumstead, S. Africa; J. Walter, Fort Brown, S. Africa; J. Sultana, Malta; B. D. Macfarlane, Remuera, New Zealand.



A well-moulded and solidly constructed model of a Douglas DC-3 air liner, built by D. J. Hofsommer, The Hague, Holland, who was awarded Third Prize in the "Aircraft" Competition.

A notable feature of this competition was the success of a comparatively inexperienced model-builder in obtaining the First Prize. F. Trasler is only 12 years old, and as some of the competitors were nearly twice his age, he has every reason to feel proud of his achievement. The model he submitted is a small but detailed reproduction of a Sikorsky S-38 amphibian. This machine has a boat-shaped fuselage, and the tail unit is mounted on two booms rooted in the upper wing. Strips and Angle Girders are used in the construction of the fuselage and wings of the model and they are arranged neatly to reproduce in a very exact manner the outline of the original. Strips are also used in forming the detail of the wing tip floats and tail structure.

P. Giese, Buenos Aires, won the Second Prize with a model of an Empire Flying Boat. Whatever subject Giese chooses he always tackles it thoroughly, and I have no hesitation in saying that his model is one of the best of its kind that I have seen. The hull is constructed entirely from Strips. There is nothing new in this, of course, but the parts are arranged so skilfully that the correct outline is obtained without undue bending. The wing is double surfaced, and consists of Strip Plates and Curved Plates bolted to a framework of Angle Girders, and in it are set four engine nacelles ingeniously built up from Strips and Curved Strips. Aeroplane Constructor parts are used for the radial engines, and the propellers are formed by Curved Strips. In two of the photographs submitted the plane is shown as though it is actually flying, and a realistic effect is obtained by removing the propellers and replacing them by discs of celluloid painted to give an impression of propellers in motion. Little points such as this undoubtedly attract the competition judges and so may form a deciding factor when it is necessary to choose between models of otherwise equal merit.



Only a few parts are used in the construction of this realistic single-engined biplane, a Gloster "Gauntlet," which is the work of J. Giese, Buenos Aires.

D. J. Hofsommer, The Hague, Holland, constructed the model that was awarded Third Prize. For his subject he chose a Douglas DC-3 low-wing monoplane, and he has succeeded in building up a very effective model. It is noteworthy chiefly for the extensive use made of Strip Plates and Flexible Plates, which are used throughout except for the nose and the tail, which are formed from Strips. As can be seen in the illustration on this page, the result is a pleasing uniformity. Double surfaced wings are fitted, but they are not quite as neat as those of P. Giese's Empire Flying Boat. There are two engine nacelles, each fitted with a Radial Engine from an Aeroplane Constructor Outfit, and the three-bladed propellers are driven from an Electric Motor concealed in the fuselage. Through a gear-box the Motor also operates automatically retracting undercarriages, which are arranged below the engine nacelles. The ailerons and elevators of the model can be moved by dummy controls fitted inside the pilot's cabin, and two flash-lamp bulbs are mounted inside Sleeve Pieces at the nose of the plane to represent the landing searchlights.

It was interesting to compare the various methods of construction adopted by competitors in reproducing similar subjects. For example, several entrants chose the Hawker "Fury" as their subject, but each of them set to work in a very different manner from the others in building his model.

G. Wilkinson, Durban, built up the fuselage from Strips, which are so skilfully arranged as to bring out the details of the actual machine in a very attractive manner. Flat Plates are used to mould the wings, each of which is double faced and is connected to the fuselage by means of Strips. The upper and lower wings are connected together by inverted N struts. The only non-Meccano part used in the construction of the model is a curved strip of brass, which forms the propeller.

In the Gloster "Gauntlet" model submitted by J. Giese, Buenos Aires, the fuselage is made of four 9½" Angle Girders, spaced at the nose by Flat Brackets, but bolted together at the tail. This construction gives an approximate representation of the outline of the fuselage of the real plane. Flat Plates are used for the tailplane and wings, the latter being joined together by struts consisting of short Screwed Rods. A Radial Engine and Cowling from an Aeroplane Constructor Outfit are mounted at the forward end of the fuselage.

C. J. Mallia, Pawla, Malta, sent a model of an Empire Flying Boat. The main merit of this model lies in the realistic appearance that is obtained by the use of comparatively few parts. A glass dome, represented by a piece of cellophane on which black lines are drawn, is fitted over the forward part of the cabin, and 1" Pulleys mounted on Rods journalled in Double Brackets form the engines.

Another prize-winner was P. Gilles, Montpellier, France. Unfortunately he submitted drawings only of portions of his model Armstrong Whitworth Bomber, and although from these it is clearly an excellent piece of work, it was not possible to award him a larger prize without knowledge of the complete model. An Electric Motor is fitted for rotating the propellers, and controls are provided for operating the ailerons, elevators and rudder. Navigation lights are mounted on the wing tips.

Among the smaller prize-winners, B. D. Macfarlane, Auckland, New Zealand, sent in the best entry. His model of a D.H. "Moth," although not very impressive so far as size is concerned, is neat and tidy and possesses several good features, including shock absorbing landing gear and cockpit controls.

MECCANO
GUILD

A Record Winter in Prospect

At this time of the year the contrast between clubs at home and those on the opposite side of the world is brought home prominently to me. In Great Britain and in the northern hemisphere generally members are returning to their club rooms for the activities of the indoor season; on the opposite side of the world, where summer is approaching, excursions, rambles and outdoor games are being keenly discussed.

The difference in programmes do not bring with them any variations in outlook. Everywhere new things are being planned so as to increase interest, and the next two Sessions promise to be record-breaking. I want every single member to make up his mind that he will do his best to ensure this. He can do so by good work in club affairs generally, and he will pull his weight even more effectively if he introduces new members to strengthen the club and give them the opportunity of sharing in the pleasures that membership brings with it.

Action along these lines will mean an increase in recruiting activities, and in this connection I want to remind all Guild members of the Recruiting Scheme. I shall be glad to send details of the Scheme to any applicant, together with copies of the Guild Leaflet, which includes a form on which to apply for membership of the Guild. Anyone bringing in three recruits within a period of three months is awarded a Recruiting Medallion, and this is engraved with his name and the words *"Special Award"* if the number is increased to six within six months. When distributing application forms members therefore should remember to put their names on them, so that I can identify their recruits.

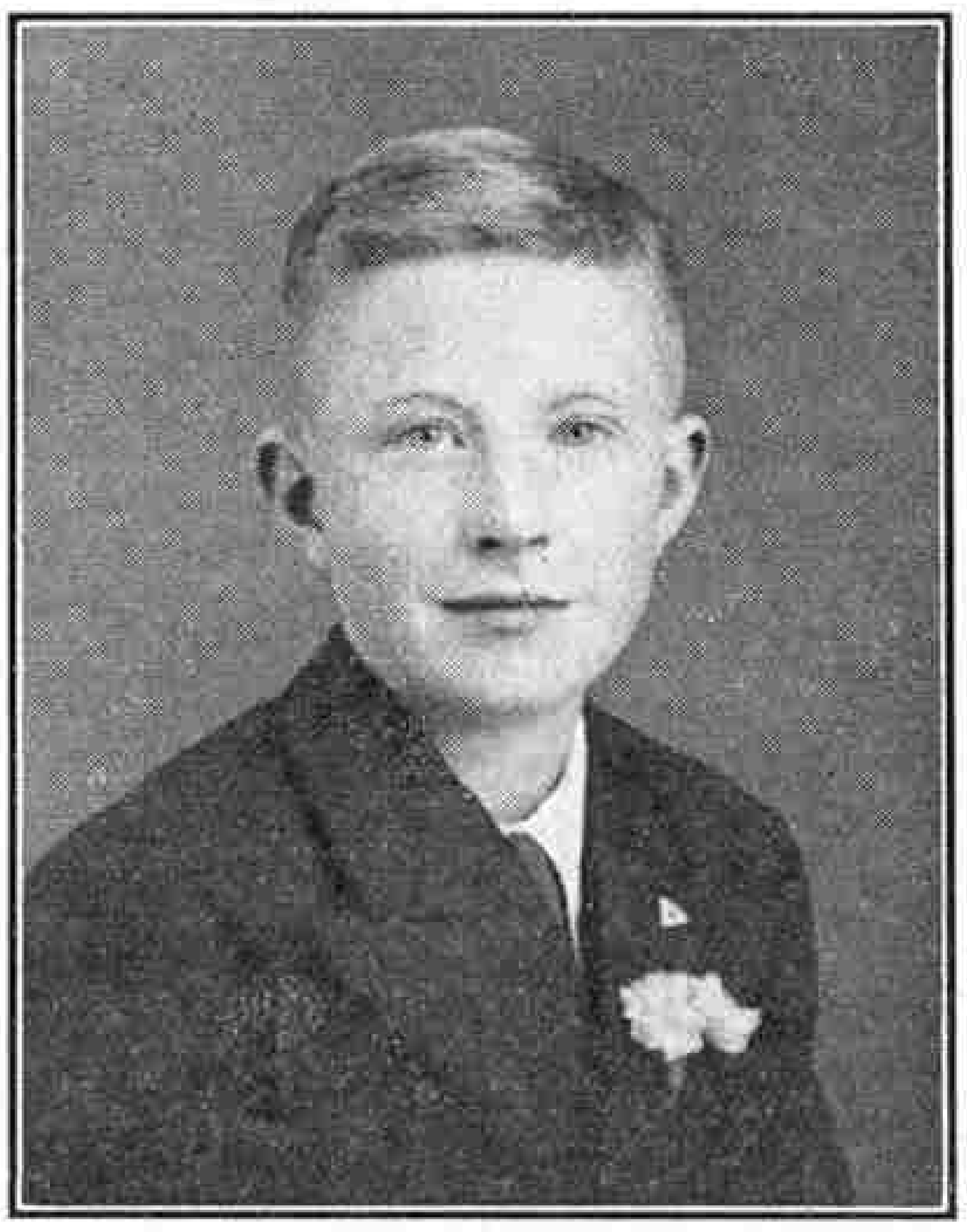
Keeping Fit

Although in most Meccano clubs model-building, Hornby Train operation and similar hobbies will occupy most of the time spent in the club-room during the next two Sessions, the need for exercise must not be overlooked. There is no difficulty in organising a "Keep Fit" movement, for elaborate apparatus is not essential, and it is not even necessary to work out any formal scheme. Instead meetings may end with 15 minutes of brisk exercise, which in this case is best obtained through the medium of an indoor game of the basket-ball type, although any kind of game with action in it will do. Members would learn to look forward to such a short period of furious activity, and the prospect would add to their enjoyment of other pursuits.

If a suitable instructor is available—and most clubs would have little difficulty in finding somebody sufficiently interested in them to give them a hand—then a more formal scheme of exercise might be taken up. Alternatively an official or senior member might take up the task. There are many books that would form useful guides, and all members, old or young, would find it great fun to take part in some simple form of training. I should be glad to make further suggestions to club officials who are interested.

Meccano Club Secretaries

No. 45. J. T. H. Fenwick



J. T. H. Fenwick has been secretary of the Exeter M.C. for three years, during which time the duties of the post have increased to such an extent, owing to the growth of the club, that M. A. England has been appointed joint secretary. Fenwick has proved himself throughout a keen and capable official, and has helped to maintain the high standard of work for which his club is noteworthy.

Lantern Lectures on Loan

Leaders looking for variety from model-building and constructional work generally will find Lantern Lectures very useful and popular. I have recently received details of new Lectures prepared by British Railways and the London Passenger Transport Board that are available for loan to clubs. The story of transport by bus and tube in London is told in eight Lantern Lectures issued by the L.P.T.B., some of which deal with the romance of London itself. There are five very attractive sets of British Railways slides, showing up-to-date locomotives, streamlined expresses, travel views and many other interesting railway scenes, and in addition there is a 16 mm. film of journeys by the *"Cornish Riviera Limited"* and other famous trains. In all cases appropriate reading matter is available, so that a very fascinating entertainment is provided.

Details of these Lectures and of others that can be obtained from various quarters are given in a revised list that I have had prepared for the benefit of club Leaders. This explains how to obtain the Lectures and the conditions under which they are issued, and I will send a copy to any club official who would like to have one.

Announcing Coming Events

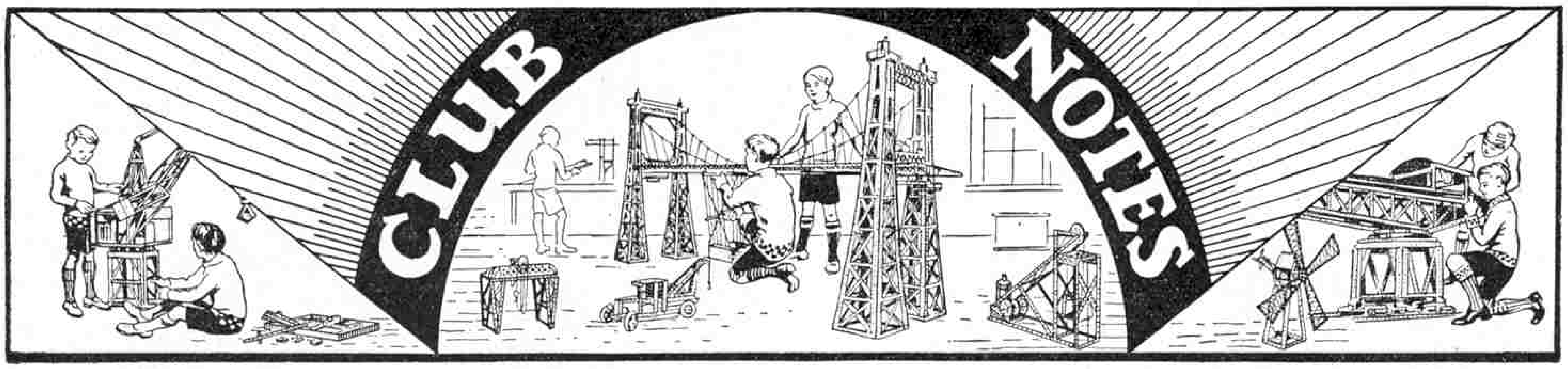
From now onward Meccano clubs will be holding Exhibitions and Open Nights. A good attendance on such occasions is a necessity, and in particular it is desirable to attract boys and young men who are interested in model-building and other club pursuits and are likely to join and become valuable members.

One way of arousing the desired interest is to insert a notice in these pages, stating where and when the Exhibition is to be held and giving the charges for admission and notes of special features. I am always very glad to include an announcement of this kind but wish to point out that details must reach me at least a month before the publication of the issue in which it is to appear. Announcements of Exhibitions to be held during the Christmas and New Year season should be forwarded even earlier. Announcements for the Special Christmas issue should reach me not later than 15th October, and those for the January issue should be in my hands by 15th November.

Proposed Clubs

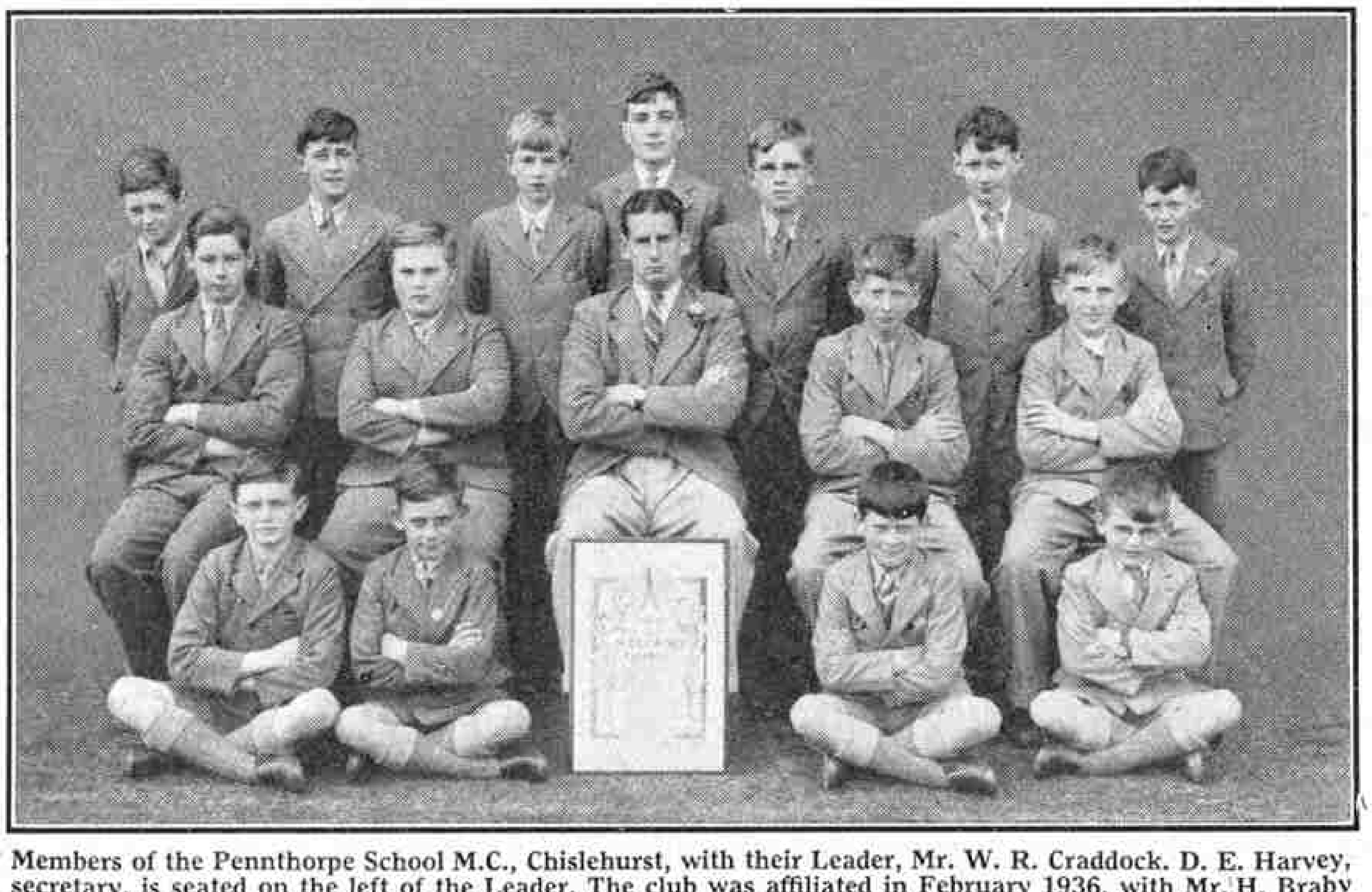
Attempts are being made to establish Meccano clubs in the following places, and boys interested should communicate with the promoters, whose names and addresses are given below:

NEW ZEALAND—Mr. A. Humphrey, 12, Morton Street, Invercargill.
BATH—P. Reed, 3, Horseshoe Walk, Bath.
BELFAST—W. A. Taylor, Heathcote, Sans Souci Park, Belfast.
HOLLAND—D. J. Hofsommer, van Weede van Dykveldstraat 37, den Haag, Holland.
NORTHAMPTON—Mr. G. L. D. Hodges, 74, Kingsley Park Terrace.
SOUTH ELMSALL—P. Whittaker, 10, Dunny Avenue, Doncaster Rd.



Plymouth M.C.—Rambles and visits to local places of interest were arranged fortnightly during summer. On one outing the Leader and 20 members went by train to Shaugh Prior, a small village about 12 miles from Plymouth, and then followed the china-clay pipe-lines to Cadover Bridge. A special meeting was held to bid farewell to the ex-secretary, R. Symons, who has since removed to London. On behalf of the club the Leader invited the President to present their gift of a leather wallet to Master Symons. The Annual General Meeting of the club was held recently. Club roll: 72. *Secretary:* A. E. Miller, 21, Hamilton Gardens, Mutley, Plymouth.

York M.C.—Numerous models have been built, including a fine tramcar, a battleship, a steam lorry and a petrol engine. Several Model-building Competitions have been held, and novel and interesting entries have been received. The Hornby Section has been reorganised, and recent meetings have been very successful. It is hoped to enrol further members, when additional activities will be introduced. Club roll: 16. *Secretary:* G. Hodgson, 1, Sunnyside, Heslington Lane, Fulford.



Members of the Pennthorpe School M.C., Chislehurst, with their Leader, Mr. W. R. Craddock. D. E. Harvey, secretary, is seated on the left of the Leader. The club was affiliated in February 1936, with Mr. H. Braby as President. A display of models at a recent School Exhibition was greatly admired by visitors.

Wednesbury M.C.—The Woodwork Section is flourishing, and many articles have been made and sold at a profit. Regular Games Evenings have been held, at which table tennis and draughts were played. Club roll: 10. *Secretary:* M. L. Done, 31, Waverley Road, Darlaston, Wednesbury.

Exeter M.C.—Holidays have affected attendances, but a satisfactory number of models have been constructed. These include a liner and a paddle steamer, an air liner, factory, and many smaller but equally well-built models. Attention is being turned to football now that the season has started. Mr. M. C. Hodder, Leader, has written the history of the club in preparation for the "Coming of Age" celebrations to be held in December. Club roll: 27. *Secretary:* J. T. H. Fenwick, 45, Calthorpe Road, Exeter.

Sutton Valence School M.C.—The club organised an Exhibition of models at the School Open Day at the end of last term, and prizes were awarded for the best models on show. The club has suffered the loss of several of its best members, who are leaving the school. These have formed a group known as "The Friends of the Club," and will continue to take an interest in the club. Mr. A. G. Freeman, the Leader, has also taken up a new post, and thus has severed connection with the club whose activities he has so ably directed for the past four years. Mr. J. R. Hennessey, Headmaster, has kindly taken over Leadership for the present. The remaining members are looking forward to the Winter Session, and are resolved to maintain the standard achieved. Club roll: 14. *Leader:* Mr. J. R. Hennessey, "Cypress Cottage," Chart Road, Sutton Valence, Maidstone.

Hornsea M.C.—Satisfactory reports were given by all officials at the quarterly committee meeting. It was decided to revise the names of the sections of the club. The last few meetings of the Summer Session were Social Nights, and various games were played. A visit to Hull Gas Works is being arranged. Club roll: 15. *Secretary:* P. Richardson, "Summerleigh," Esplanade N, Hornsea.

Great Baddow M.C.—The "Strips" were the first section to win the new "Points Cup," and now hold it for three months. This trophy is awarded for all-round activity, and encourages friendly rivalry between the four sections of the club. Members are busily engaged in building models for the club's display at the three-day Exhibition to be held in October by the Chelmsford Society of Model Engineers. At two meetings games were played, and the treasurer showed some mystifying card tricks. A discussion on the programme for the Winter Sessions has taken place, and several novel suggestions were forthcoming. It is hoped to visit the Ford Motor Works at Dagenham. A prize has been offered for the member who recruits most honorary members during the next few months. Club roll: 23. *Secretary:* K. J. Avis, 3, Crescent Road, Great Baddow.

Islandmagee M.C.—The programme has included several cricket matches, and exciting treasure hunts. Members are now rehearsing for the concert to be given in November. An interesting programme has been drawn up for the Winter Sessions. "*The Gazette*" is now a printed publication, and looks very attractive in its new form. Reports of the club's activities appear regularly in three local newspapers. Club roll: 17. *Secretary:* S. McCready, "Hillmount," Islandmagee, Co. Antrim.

Breich M.C.—Regular meetings have been held, and good work has been done. Outdoor activities have been confined to several cricket matches. The outstanding model produced recently by the Woodwork Section was a doll's house, which looked very realistic when appropriate Dinky Toys were added. Several tents were placed at the club's disposal, and they made good use of these for camping during the holidays. Extensive preparations are being made for the Annual Exhibition to be held shortly. A large countryside scene incorporating numerous Dinky Toys will be an outstanding feature of this. Wooden calendars are being made for sale to visitors at the Exhibition. A celebration was held recently to mark the commencement of the Winter Session. Attendances have been very good at all meetings. Club roll: 9. *Secretary:* M. Anderson, 36, Breich Terrace, West Calder.

Old Charlton M.C.—Members have enjoyed a pleasantly varied programme. On one Model-building Evening the subject was "Bridges," and excellent examples of bridges of numerous types were brought along. For a Trick Evening each member had to bring along a trick to play on the other members! A successful Spelling Bee has been held, and an interesting Place Names Contest occupied one meeting. The first two meetings of the Winter Session were devoted to the election of officers and the committee. A list of subjects for model-building has been drawn up for future meetings, while other arrangements are in hand to complete the programme. The latest issue of "*The Meccanic*," the club magazine, has been increased in size by four pages, and contains stories, articles of interest and competitions. Club roll: 33. *Secretary:* F. J. Ambrose, 72a, Charlton Road, Blackheath, London S.E.3.

Coloured Mission (Cardiff) M.C.—After a short break club meetings have been resumed, and attendances have been good. Winter Session activities are in full swing. Members show the usual keenness in the regular Model-Building Contests, which will be continued throughout the winter months. A celebration has been arranged on the club's Birthday. *Secretary:* D. H. Binstead, 37, Penhill Road, Llandaff, Cardiff.

Winchmore Hill Collegiate School M.C.—A recent outing proved an outstanding success. Members went by train to Hertford, where a circular route through the country was followed on foot. An enterprising member fitted up a microphone and loudspeaker for announcement purposes at the school sports, and this was greatly appreciated. The reconstruction of the club's model railway was continued during the summer holidays by a group of members. Club roll: 34. *Secretary:* F. J. Hearn, 143, Conway Road, Southgate, London N.14.

AUSTRALIA

Maylands M.C.—The Mouth Organ Band made their first public appearance, and were well received. A second Club and Factions Exhibition took place recently, the Faction Contest being won by Green and Gold, with only one point margin over Red and Blue, who were themselves but four points ahead of Blue and Gold. Mr. Patterson was awarded a Merit Medallion for his services in connection with the Band, which gave an item during the evening. The model display included an oil driller, a meccanograph, a vertical log saw, and a transporter bridge with automatic reversing gear. There was a record turnout for a paperchase, which proved both enjoyable and exciting. A bicycle ride to National Park was greatly enjoyed. Mr. V. Malmgreen, Leader, showed members over the works of the Southern Cross Windmill and Engine Manufacturing Company, where he is employed. Club roll: 36. *Secretary:* R. Le Cheminant, 60, Crawford Street, Maylands.

Thebarton Technical School M.C.—Meetings have been resumed and excellent progress is being made. Mr. Gibson has given two instructive talks on "*Musical Boxes*" and "*Calculating Machines*." Lantern Lectures have dealt with "*Wireless Transmitters*" and "*The Growth of Electricity*." A special effort in aid of the Projector Fund realised £2. Members have visited "*The Advertiser*" Printing Offices, Adelaide Observatory and the Islington Railway Workshops. Club roll: 71. *Secretary:* B. S. Clarke, 21, Victoria Street, Glandore, South Australia.

NEW ZEALAND

Christchurch M.C.—Mr. J. Ancall has had to resign the position of Leadership owing to ill-health. Mr. E. A. Gay is filling the position temporarily. A Hornby Train Evening proved very popular, and a Model-building Competition was equally successful. The new Library is now completed, and D. McLaren has been elected librarian. A further interesting issue of "*The Coupling*" has been produced. It is expected to enrol several new members shortly. Club roll: 38. *Secretary:* S. S. Stringer, 250, Oxford Terrace, Christchurch, C.1.

SOUTH AFRICA

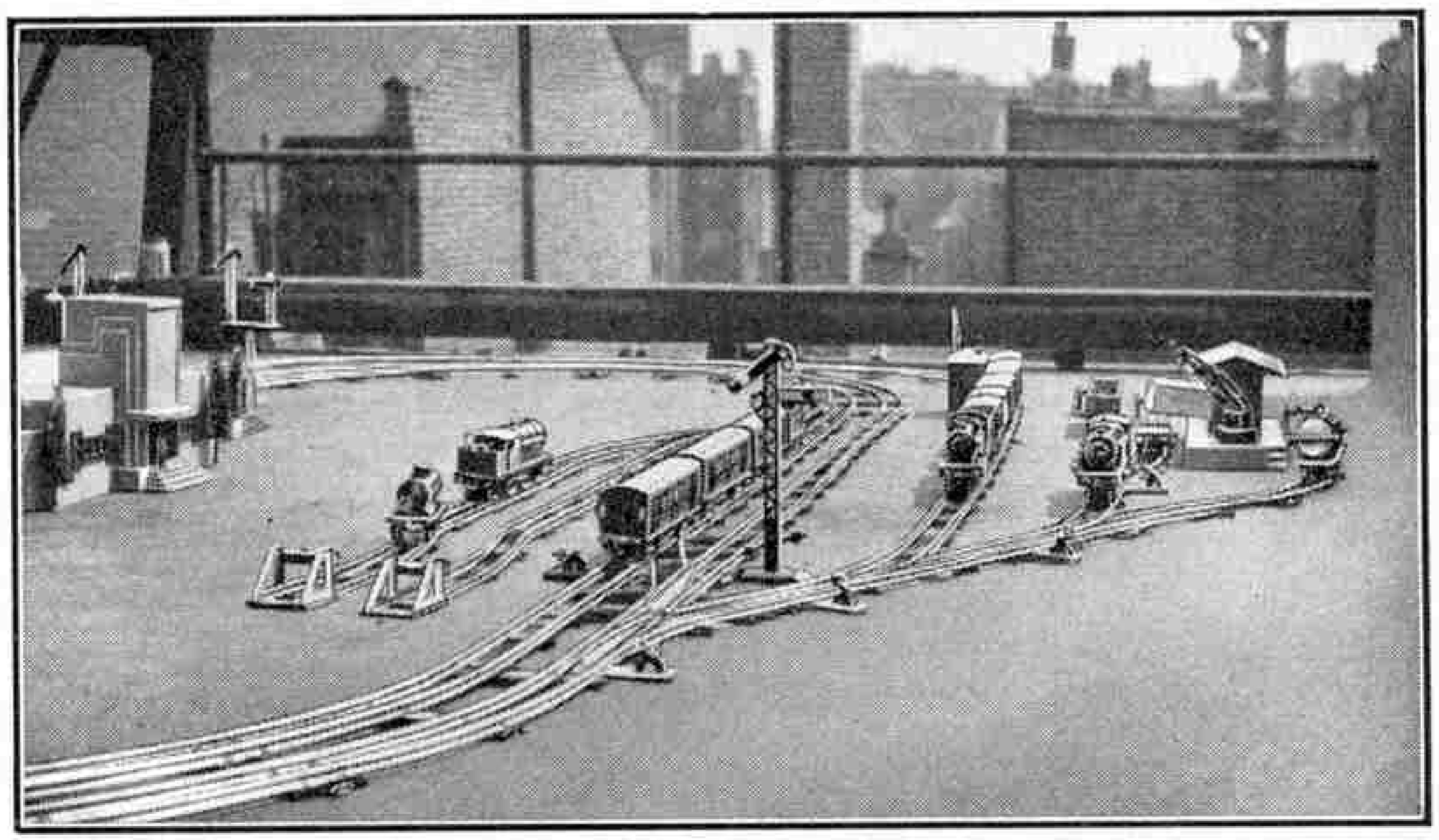
Southern M.C.—The club displayed a model at the Hyman Liberman Exhibition at Capetown. Junior and Senior Sections are busily engaged in model construction and a meccanograph and a steam shovel have been completed. A detailed model of a motor chassis is under construction, and special attention is being paid to the braking mechanism. Frequent outings have been held, including visits to various sports meetings. Club roll: 14. *Secretary:* R. H. Moodley, 10, Stirling Street, Capetown.

Malvern M.C.—An intensive programme has been followed during the year. Regular Model-building Evenings have been held, special subjects such as aeroplanes being set for each meeting. A dance was held to celebrate the club's birthday. A most enjoyable picnic also has taken place. The Dramatic Section has recommenced activities. A visit has been arranged to the Johannesburg General Post Office. On one evening a series of talks on subjects of general interest were given by members. The first issue of the club's magazine was quickly disposed of. Club roll: 68. *Secretary:* C. Courtis, P.O. Box 8, Cleveland, South Africa.

A Portable Hornby Clockwork Railway

Realistic Working on a Temporary Layout

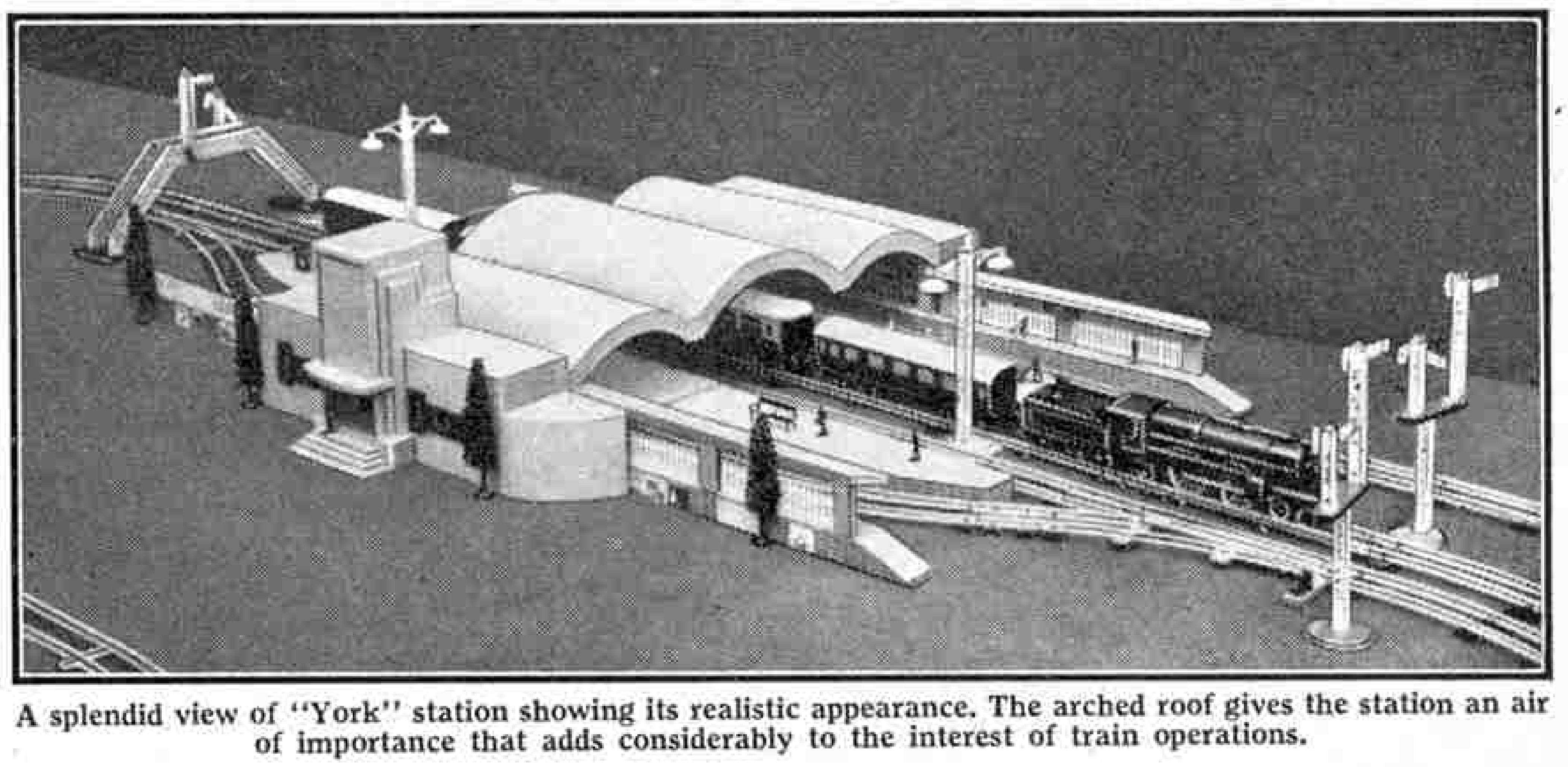
MANY of the layouts operated by readers and by H.R.C. Branches that have recently been described in these pages have been of the permanent type. There are however countless others that can only be laid down for comparatively short periods, or have to be taken up when operations are completed, and yet are no less realistic and provide equally attractive running. An excellent example is the Hornby railway illustrated on this page, which is owned by Mr. Thomas Elsdon, of Lewisham.



A general view of part of the layout described on this page. The railway was laid out for this photograph on the roof of a London cinema, an unusual place for a miniature railway system.

This layout consists of a main line oval of Hornby Double Track, with a long loop line running along three sides of the complete system and a short loop connecting two platforms of the main station. There are two stations, one on each side of the layout. The more important of the two, which is known as "York," has four platforms with a total of six working faces, although there are at this point four tracks only. Actually the two main platforms are islands with double track between them, and the loop tracks pass outside them.

The lower illustration on this page shows a view of "York" station, which was constructed at home by the owner of the layout and a friend. It is of realistic modern design, with an arched roof extending across the four tracks and covering a great deal of the platform area. The entrance hall and interior are fitted with electric lighting, and in addition there are Hornby Lamp Standards between the two main tracks at each end of the station.



A splendid view of "York" station showing its realistic appearance. The arched roof gives the station an air of importance that adds considerably to the interest of train operations.

The wayside station on the opposite side of the layout to "York" consists of an island platform. It is not served by the inner main line track, but is placed between the outer of these tracks and the long loop line previously referred to. This arrangement, and the inclusion of crossover points connecting the inner and outer main tracks, make some interesting working possible. The main inner track can be reserved for traffic in one direction only; the long loop line can deal with traffic in the opposite direction, and the outer main track can be used for trains running in either direction as required, an interesting instance of what is known in real practice as reversible working.

Sidings are situated off the inner main line in the area served by the wayside station, and accommodation for freight traffic is provided by means of a Hornby Goods Platform, which is served by sidings reached through points leading from the outer loop.

"York" is a suitable title for the main station, for both L.N.E.R. and L.M.S. engines and rolling stock are to be seen there as in the real station of that name. The L.N.E.R. is represented by two well-known Hornby Locomotives, the No. 3C *"Flying Scotsman"* and the No. 2 Special "Hunt" class engine *"The Bramham Moor."* As a general rule these are used only on express passenger trains. Among the L.M.S. engines is one of the popular No. 2 Special Standard Compounds. It is frequently used for express freight work, while the less important goods duties, local traffic, shunting and empty carriage working are shared by a pair of 4-4-2 No. 2 Special Tanks.

Ordinary passenger trains are made up of Hornby No. 2 Passenger Coaches, which are ideal for this purpose. Important express trains are formed of No. 2 Corridor Coaches, and for special luxury services there are available several of the splendid No. 2 Special Pullmans. A great variety of wagons and vans for freight traffic are in use, including such special-purpose vehicles as Milk Tanks, Meat and Refrigerator Vans. A special feature indeed is made of a well-developed container service.

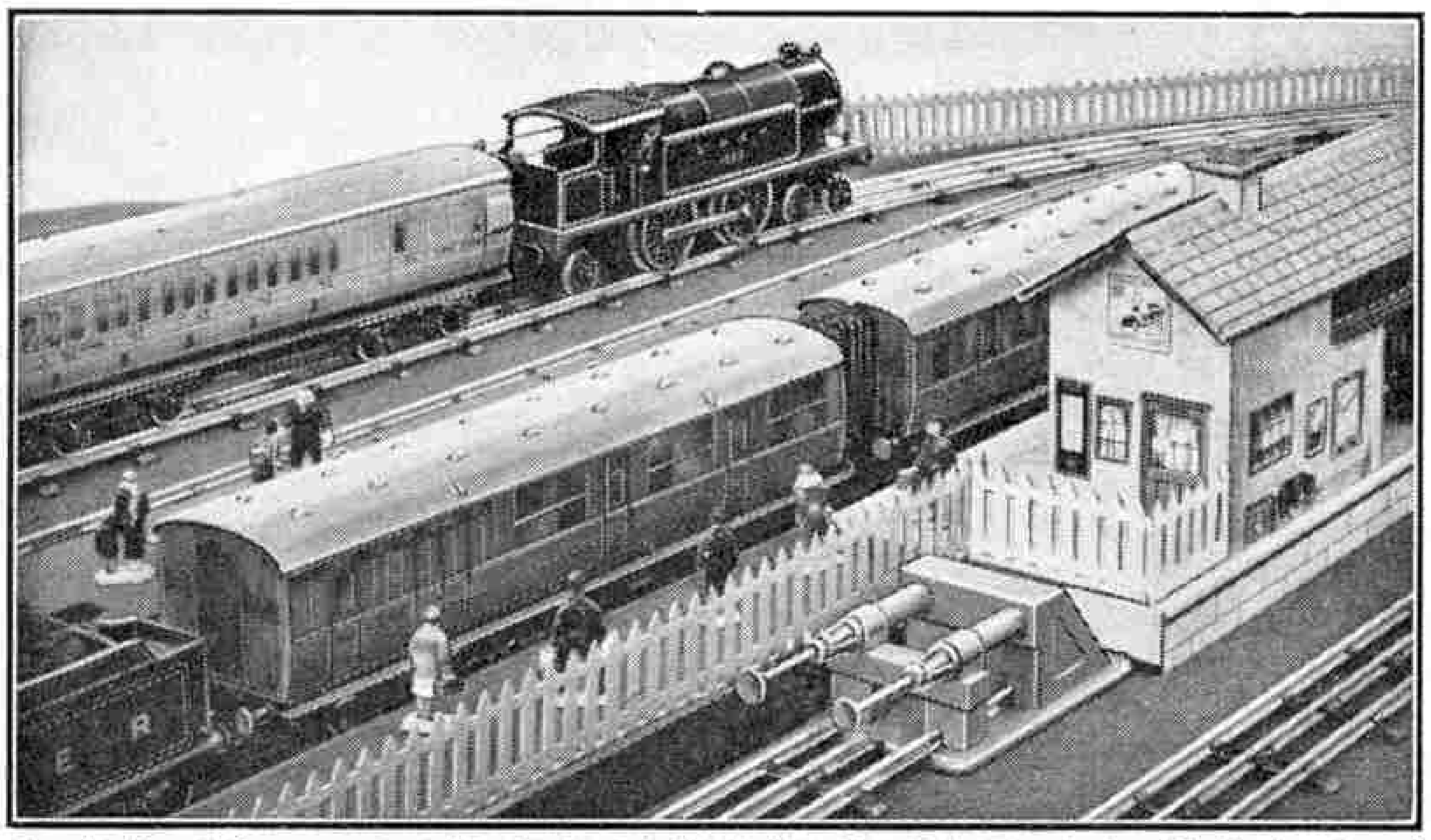
The line is usually laid in the drawing room of Mr. Elsdon's house, and it is not usually left assembled for running for a longer period than a week at a time. It takes some three hours to lay down the rails and to arrange the stations and other accessories. A feature of special interest, which represents in miniature a triumph over "geographical difficulties," is that for part of its length the railway burrows under a settee, which forms a splendid long tunnel!

Buffer Stops in the Hornby Series

By "Tommy Dodd"

THERE are buffer stops of one kind or another at the end of every railway track. They are prominent in every terminal station and goods yard or siding, and altogether are characteristic and familiar objects on real railways.

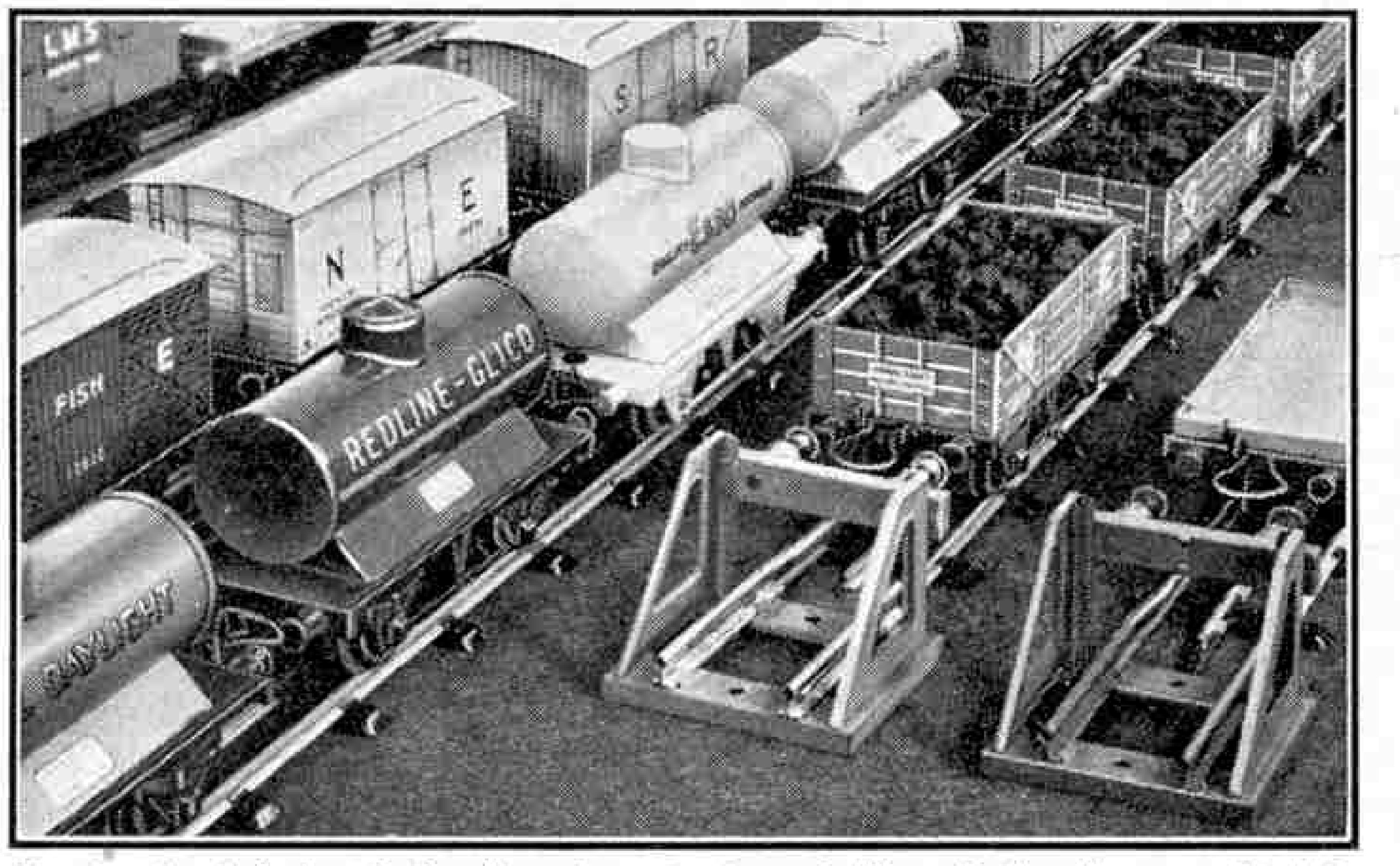
The actual form of the buffers depends on requirements. In big terminal stations, where main line trains are dealt with, it is usual to employ hydraulic buffer stops powerful enough to bring to a standstill a train of several hundred tons' weight moving at a moderate speed. In smaller stations less elaborate stops having buffers of the ordinary spring type are found; many stops in sidings consist of a massive buffer beam supported by a framework built up of rails or of heavy timbers, and in country districts especially a "dead end" consisting of a stockade of sleepers filled with earth is a common sight.



An effective station scene on a Hornby layout. The buffer stops that are prominent in the foreground are of the No. 3A type referred to on this page.

Buffer stops are equally important on a miniature railway, for a track coming to an end without them would look most unrealistic. The hydraulic and spring patterns, the two main types found in real practice, are both represented in the Hornby Series.

Hornby Hydraulic Buffer Stops are available in three types known as No. 2, No. 2A and No. 3A respectively. The action of real hydraulic buffer stops depends on water pressure. They consist of a supporting framework upon which are mounted two long cylinders. One end of these cylinders is closed and from the other end projects a long stout rod, at the end of which the actual buffer head is formed. On the inner end of the rod or shank is a piston that is forced backward along the cylinder when a train strikes the buffers. The resistance of the water to its motion increases as it moves along, and brings the train to a standstill.



Hornby No. 1 Spring Buffer Stops in a goods yard. These Buffer Stops are ideal for terminating sidings, and can be used also for passenger lines.

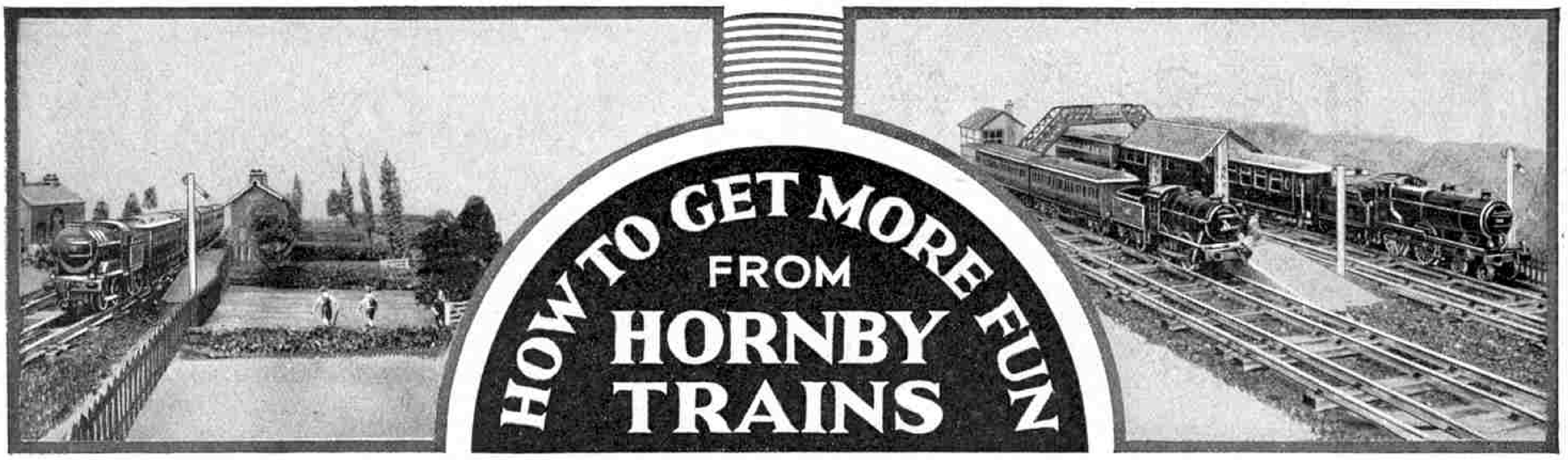
For obvious reasons Hornby Hydraulic Buffer Stops are not made to work hydraulically; instead they depend for their action on the use of springs, but otherwise are splendid representations of the real thing. The No. 2 and No. 2A types are designed for use with Hornby Tinplate Track, both clockwork and electric, while the No. 3A model is intended specially for connecting to Hornby Solid Steel Track.

The No. 2 type represents the familiar pattern of hydraulic buffers where the framework consists of heavy timbers suitably braced. The No. 2A and 3A are of simpler but very effective design. They represent the modern type of stops in which the supporting timbers at the rear end are replaced by a solid block, usually of ferro-concrete.

The Hornby No. 1 Buffer Stops are of attractive design. They incorporate two spring buffers mounted on a beam supported by suitable framework erected at each side of the rail. They are ideal for terminating all sidings, and some idea of their effective appearance, especially in a goods yard, may be gathered from the lower illustration on this page. Hornby No. 1 Buffers can also be used at the end of branch lines, and even in terminal stations. Buffers of the spring type can be seen in real termini, in addition to those of the hydraulic pattern. They are invariably employed on lines devoted to parcels and milk traffic, and so on. They are employed to a great extent in carriage sidings, and they are sometimes to be seen on engine roads.

No. 1 Buffer Stops are primarily intended for use with Hornby Tinplate Rails. They can, however, be used in conjunction with Steel Track by means of the AP Adapting Pieces, which make it possible to join the Solid Steel and the Tinplate Rails together.

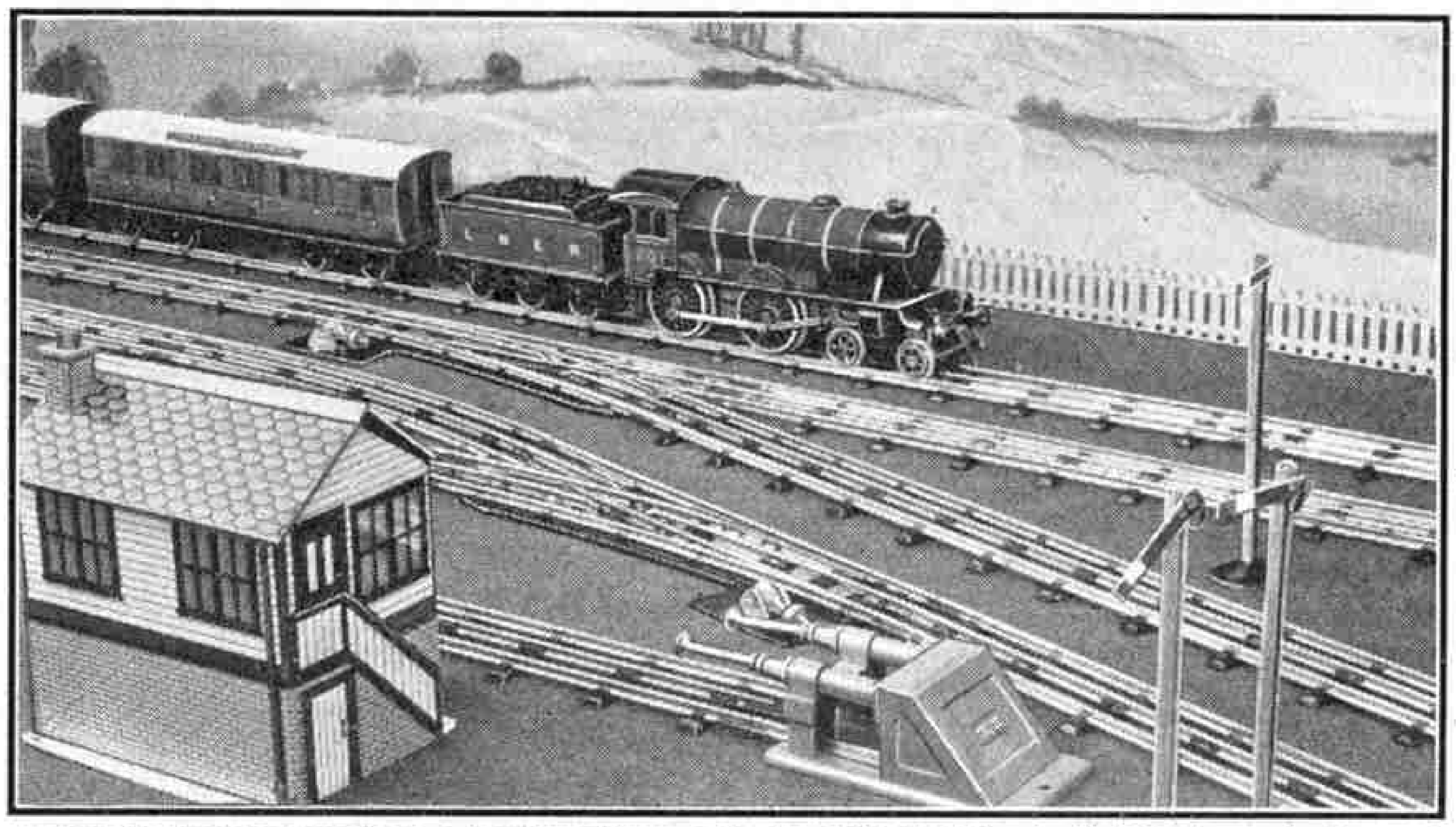
The Hornby No. 2A and No. 3A Buffer Stops are designed so that they can be fitted with a special Lighting Accessory; this consists of a realistic lamp that is provided with a fixing bracket for attaching to the buffer frame. The No. 1 Buffer Stops cannot be fitted with Lighting Accessories, but the similar No. 1E Buffer Stops are supplied with lamps. Layouts are greatly improved by the inclusion of Hornby Buffers fitted for electric lighting, and the red light sends out its warning to the driver of a Hornby Locomotive of the approach of journey's end.



HOW TO GET MORE FUN FROM HORNBY TRAINS

MAINTENANCE WORK ON A HORNBY RAILWAY

ON a real railway the track, engines, rolling stock, signalling equipment and so on have to be kept in a thorough state of repair. Similar maintenance work is desirable on a Hornby railway if the greatest possible amount of fun is to be obtained from the hobby, and this is a particularly suitable time of the year to carry it out. Most miniature railway owners are keen enough to operate their trains more or less all the year round, but more attention is given to model railways with the advent of the winter months, and in this article we propose to give a few suggestions with regard to the examination and overhaul of the various components.



A realistic junction layout on a Hornby railway laid with Solid Steel Track. Periodical examination and cleaning of the track is a wonderful help to good running.

It may be thought that work of this kind is tedious. It certainly can be, but if tackled in a systematic way it provides quite enjoyable variety, and the trouble-free running that results makes the work involved really worth while.

The basis of all railways, real or model, is the track, for unless this is in sound condition smooth running of the trains cannot be expected, and there is the constant danger of derailments. We will deal with the care of Hornby Tinplate Rails first. The various components, Rails, Points and Crossings, should be examined for any faults. Bent rails should be specially looked for, and if the damage is not serious these can be made fit for further use by a little straightening. Any looseness of rail connecting pins should be corrected by the use of a pair of pliers, but care must be taken not to deform the rail in any way. It is also advisable to check the gauge of the track by means of the rail gauge formed by the back of the handle of the Hornby Clockwork Locomotive winding key, or by the combined rail gauge, screwdriver and spanner packed with electric locomotives. If the gauge portion of either of these is slid along between the rails any tight places will be immediately revealed, and there the rails should be eased apart gently with the fingers.

The Connecting Plates may require a little correction with a pair of pliers, as they tend to become bent and slack with constant use. They are essential in a layout that is not permanently screwed down to a baseboard, so that it is as well to see that there is a plentiful supply of them. They can be obtained separately if required, and are listed in the Hornby Train Catalogues.

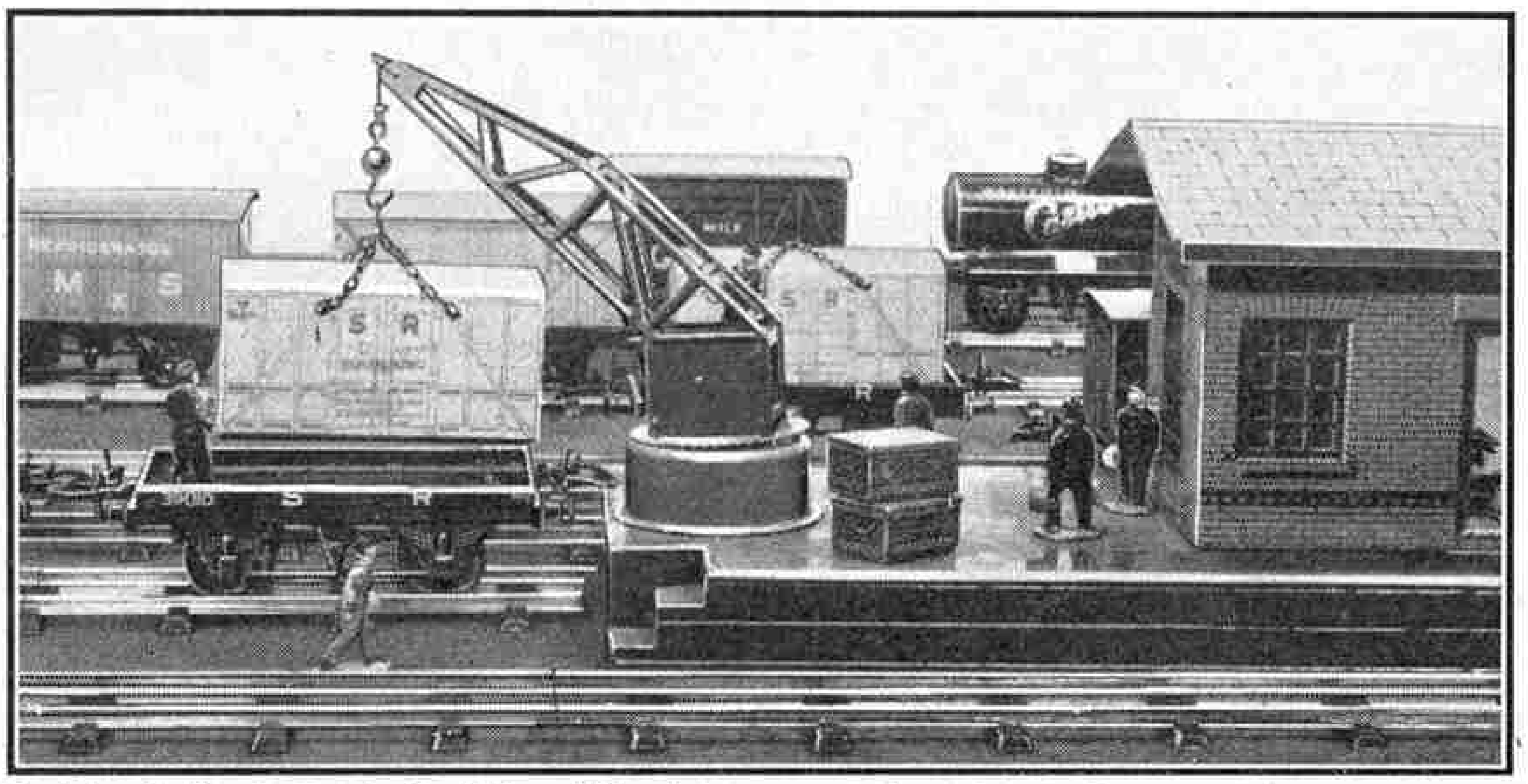
Points and Crossings should not be neglected. Crossings can scarcely get out of order to any greater extent than ordinary rails, and similar measures to those just described should be applied. Points, however, especially the switch rails and operating gear, should be carefully examined, as they may require a little bending one way or the other. If they are inclined to be stiff it is not advisable to oil them, as a little friction is of advantage in preventing the switch rails moving under a train with disastrous results.

For those who have Hornby Solid Steel Track similar methods should be followed, although there is less likelihood of actual repair work being necessary owing to the robust nature of the Solid Steel Track. It is advisable, however, to test the track for its truth to gauge, and to make sure that the right number of fishplates are attached to each rail length.

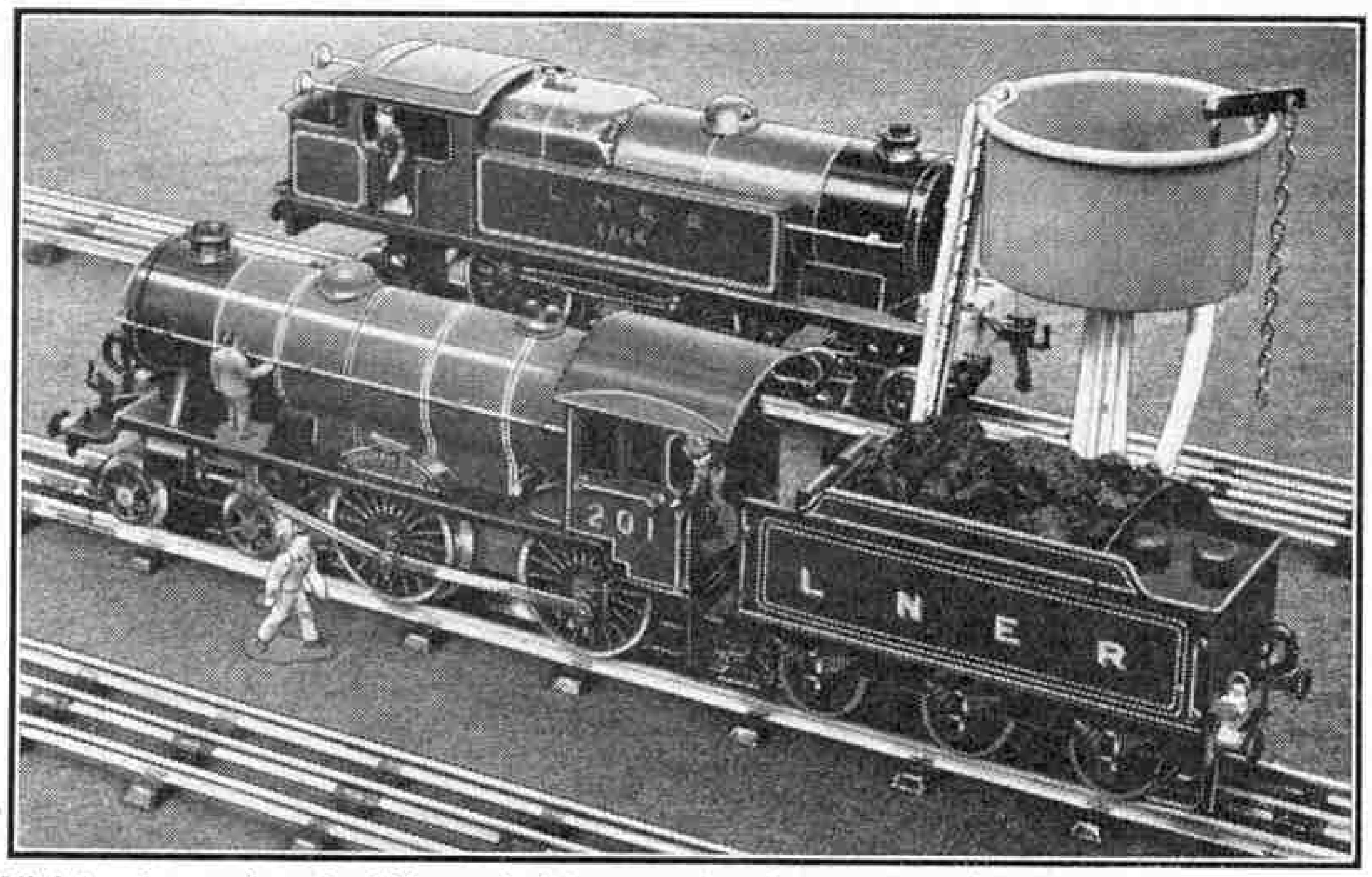
Whatever type of track is used it is as well to wipe over each rail with a clean dry rag. If this fails to remove the dirt that forms on the rail heads the rag should be moistened with a very small quantity of petrol. This must be done out of doors, in order to make sure that the petrol is not near any fires or flames. It is not advisable to use paraffin for this purpose, for this takes longer to evaporate, and its use leaves the rails slippery.

When attention to the track has been completed the locomotives and rolling stock can be taken in hand. After a period of storage during the summer their running will probably be on the sluggish side. To obtain free running it is necessary to remove old oil and dust that may have settled on the oily surfaces. Clockwork locomotive mechanisms should be given a thorough washing through with petrol, which can be applied from an oil can kept specially for this purpose, or a brush can be used, preferably a small paint brush of the "mop" type. As before, this should only be done away from fires and in the open. When the mechanism is clean the engine should be set aside for the petrol to evaporate, and the moving parts are then lightly oiled with Meccano Lubricating Oil. It is a good scheme also to apply a small quantity of Meccano Graphite Grease to the spring of the mechanism.

Electric locomotives require similar attention to their moving parts, such as axles, gears and so on, but the cleaning operation should be very carefully done, and only the smallest quantity of petrol used for the purpose. The electric motor should be examined, and the commutator should be cleaned in the manner described in the Instruction Leaflets packed with electric locomotives. The brushes should never be interfered with. If they have worn down, or are performing unsatisfactorily, the locomotive should be returned to the Service Department at Meccano Ltd. for attention.


Container traffic at a Hornby Goods Depot. How to keep accessories such as the Crane shown in this photograph in good order is explained in this article.

A point to be watched when carrying out these cleaning operations is that the dirt rolled into the wheel treads by a period of running should be removed. It is usually possible to do this by wiping each wheel tread with a clean dry rag. Moistening it with petrol will be an advantage if the dirt forms a thick deposit, or has become hardened. It is surprising what a difference the removal of this makes to the running of a train, and to the performance of the locomotive. In the case of tenders and rolling stock generally, where the wheels are inside the frames, it is a good plan to remove the wheels entirely for cleaning. The axle ends should be wiped at the same time, and if necessary the miniature axle-boxes, where these are fitted, should be cleaned with a fine brush, and repacked with Graphite Grease.


Miniature locomotives should be serviced just as real engines are. The Dinky Toys Railwaymen shown in this photograph are making sure that "The Bramham Moor" is in good running order.

Accessories also require attention from time to time, but the amount of work that is necessary on them depends on their exact type. Working accessories such as signals, level crossing gates, buffer stops and cranes will require cleaning, and the application of a drop of oil to their working parts, just as much as locomotives and rolling stock. Dust should be removed by the use of a brush, and any further cleaning can be carried out with a rag. The various spindles and working joints in the signal operating connections can be given a drop of oil, or if preferred a little Graphite Grease can be applied. Similarly the hinge pins of the Level Crossing Gates and the shanks of the Hydraulic or Spring type Buffer Stops should be lubricated.

Platforms, station buildings and other structures should be cleaned up in a similar manner, and any bent portions should be straightened out if possible. Any scratched or chipped places can be touched up with paint, a hint also that applies to rolling stock and practically all the components of a miniature railway system. It may be found that some of the Railway Staff and perhaps one or two of the Passengers need a little rejuvenating in a similar manner. Attention to details of this kind gives a much smarter and more businesslike appearance to the line.

On electrically-operated layouts the various terminals, electrical connections and so on should be overhauled. The plug of plug and socket connections may have become slack. If so they can be made to fit more tightly in their sockets by prising their forked ends apart very slightly by means of a penknife or a Meccano Screwdriver. Missing terminals should be replaced, and on electric layouts where tinplate rails are in use a supply of Fuse Wire should be provided for use on the Terminal Connecting Plate or EMC Combined Switch Rail. Electrically-lighted accessories should be examined, and each one should be tested to see that it is satisfactory. Any feeble or burned-out bulbs of course should be replaced immediately.

Meccano Transformers fitted with speed regulators do not usually require any attention, but the brass studs should be cleaned from time to time to ensure good contact between the control handle and the studs. Bad contact between these points will affect the running of the engine.

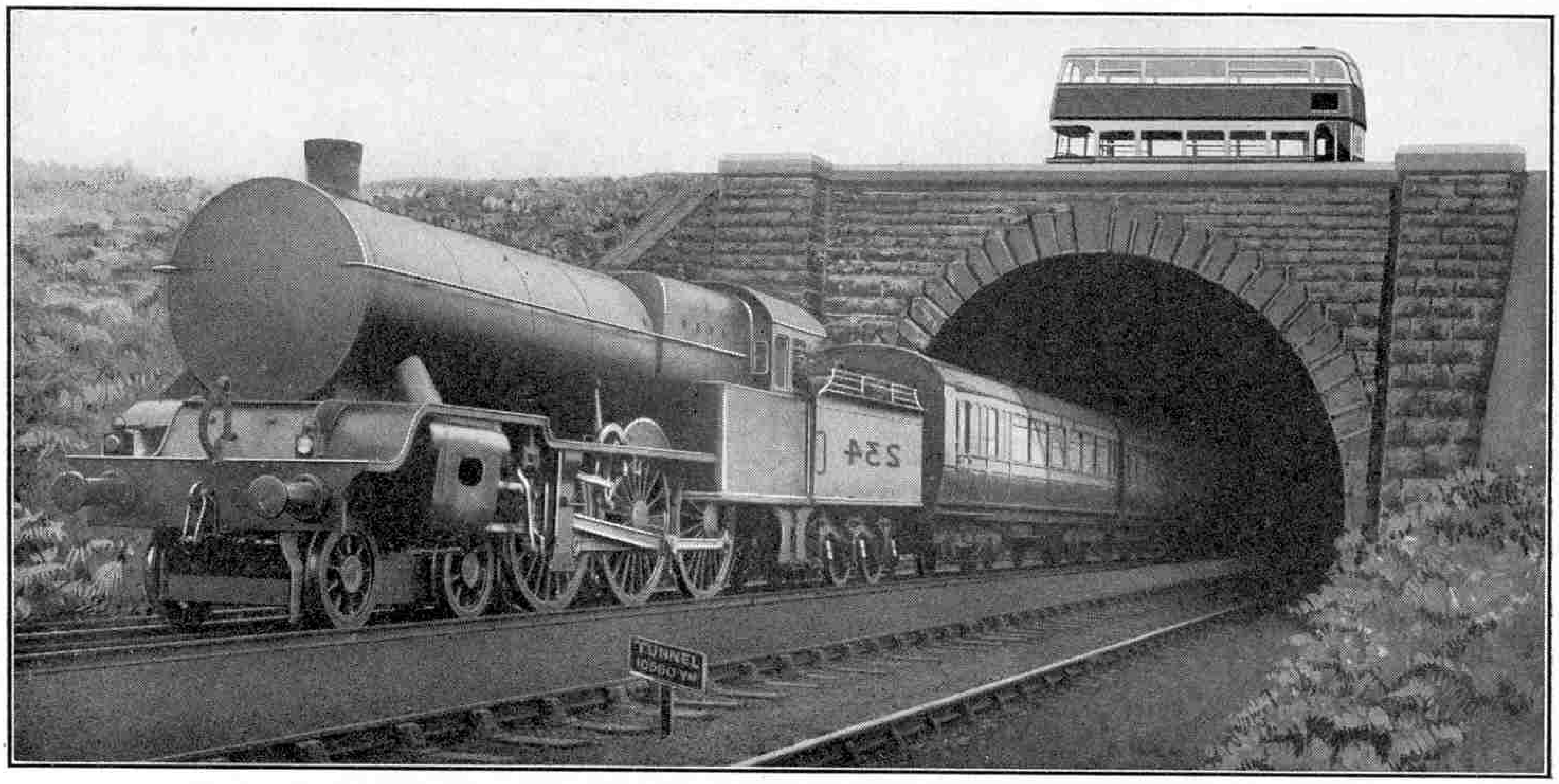
Before the season's operations are commenced an inventory of spare materials should be taken by the system's "Stores Department." This is most important, and deficiencies in any items such as Meccano Lubricating Oil, Graphite Grease, spare wire and plugs and sockets should be made good.

Join the Hornby Railway Company and become eligible for the competitions announced on this page.

H.R.C. COMPETITION PAGE

"SPOT THE ERRORS No. 3"

Join the Hornby Railway Company and become eligible for the competitions announced on this page.



This month we announce the third of our series of "Errors" Contests, in which competitors are required to detect mistakes purposely introduced into an illustration. The picture on this page shows what at a glance appears to be a perfectly normal railway scene. A casual inspection will reveal various mistakes, however. There are others that are not so obvious, and members are asked also to find these.

It will be found best to divide the illustration into sections, and to examine each of these in turn, making a note of each mistake discovered. A neat list of all the errors found should then be made, with a note showing how each should be corrected and this should be forwarded to Headquarters at Meccano Ltd., Binns Road, Liverpool 13. The envelope containing the entry should be marked *"H.R.C. Errors Contest No. 3"* in the top left-hand corner.

The contest will be divided as usual into two sections for Home and Overseas competitors respectively, and in each section prizes of any goods manufactured by Meccano Ltd., to the value of 21/–, 15/– and 10/6 respectively will be awarded to the senders of the three best entries in order of merit. A number of consolation prizes will also be awarded to the senders of the next best entries.

The closing date for the Home entries in this contest is 31st October. The Overseas closing date is 31st January 1939.

Layout Planning Contest

A good layout is necessary if the greatest fun is to be obtained from operations on a Hornby Railway, and in this contest handsome prizes are offered for the best layout designs based on a main line oval of either single or double track. The layout must be one that could be built up by using standard Hornby Rails in a maximum space 15 ft. long and 10 ft. wide, and a passenger and goods station should be included.

The contest will be divided as usual into two sections, Home and Overseas, and the prizes will consist of any products manufactured by Meccano Ltd. to the value of 21/–, 15/– and 10/6 respectively. Envelopes containing entries should be marked *"H.R.C. Layout Planning Contest"* and posted to reach Headquarters at Meccano Ltd., Binns Road, Liverpool 13, not later than 31st October. The closing date for the Overseas section is 31st January 1939.

COMPETITION RESULTS

HOME

July "Drawing Contest."—First: J. Laing (55374), Dunstable, Beds. Second: F. Mills (31), Kearsley, Nr. Bolton. Third: G. Whalley (56064), Aspley, Nottingham. Consolation Prizes: A. J. Bartlett (57475), Brandon Hill, Bristol 1; K. Pargeter (49442), Stourbridge, Worcs.; D. V. Thornton (59664), London N.W.4; E. W. Dredge (59731), Fordingbridge, Hampshire.

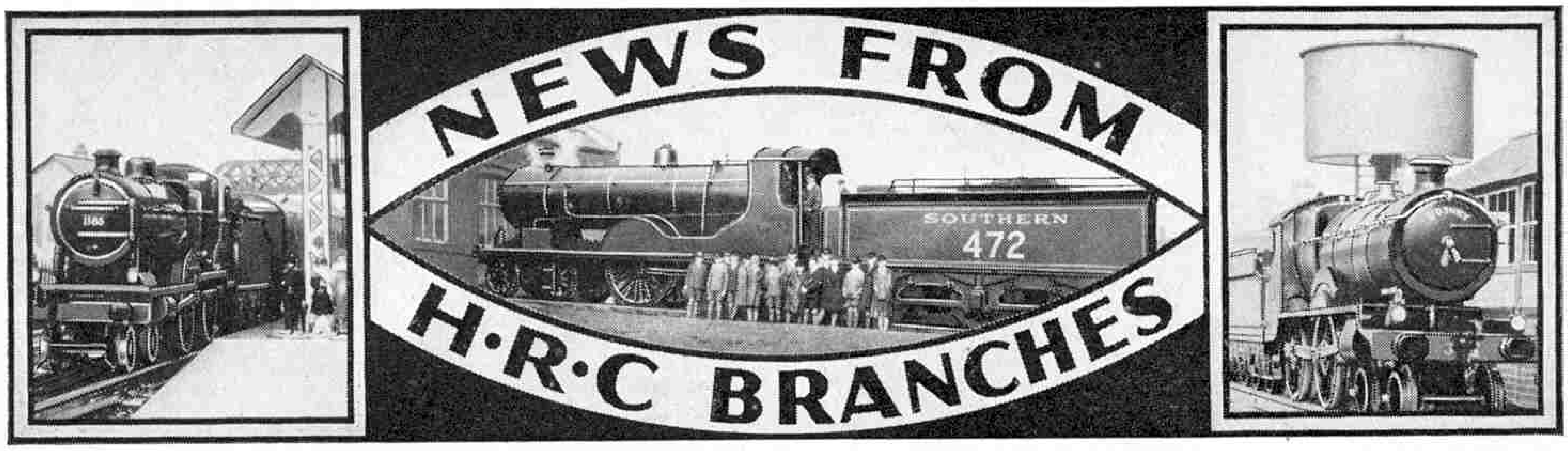
July "Mixed Names Contest."—First: D. H. Earle (41617), Wembley Park, Middlesex. Second: J. J. Hill (34385), Sherwood, Nottingham. Third: D. Waterman (49325), Esher, Surrey. Consolation Prizes: F. Gilbert (58935), Wokingham, Berks.; J. C. Button (10335), Crewe, Cheshire; C. S. Tricker (899), Mitcham, Surrey; F. Mills (31), Kearsley, Nr. Bolton; G. L. Matthewman (1719), Ashford, Kent; H. T. Buckingham (23588), Bletchley.

July "Railway Photographic Contest No. 4."—First: J. F. Taylor (42922), Beckenham, Kent. Second: C. Spencer (44179), Sheffield 6. Third: D. H. Wakely (17486), Cheam, Surrey. Consolation Prizes: P. Bush (50200), Aughton, Nr. Ormskirk; A. T. Wright (41362), Great Barr, Birmingham 22; A. Skelhorn (58885), Widnes; K. Goodridge (54039), Littlehampton, Sussex; L. G. Edwards (53625), London S.W.9; J. Habart (53689), London N.W.11.

OVERSEAS

April "Railway Photographic Contest No. 1."—First: T. Watson (18065), New South Wales, Australia. Second: P. Macdonald (43305), Toronto, Canada. Third: R. Pearson (29199), Victoria, Australia. Consolation Prizes: R. B. McMillan (9592), Victoria, Australia; A. A. Shawky (53749), Orman, Egypt; H. Bennett (10615), Auckland, S.W.1, New Zealand; W. Jack (8958), Victoria, Australia; R. Myburgh (37538), Capetown, South Africa.

NEWS FROM H·R·C BRANCHES



Branch News

Islington.—Meetings have been devoted to track operations and constructional work on a large terminal station, which has a glass roof. Junior and Senior Sections have been formed for train working. They use separate layouts, with both electric and clockwork track. A Talk has been given on *"Modern Inventions,"* and at one meeting a story from the *"M.M."* was read. Games have been played at several meetings. Secretary: J. H. Cronin, 1, Aubert Part, Highbury, London N.5.

Copnor.—Track working has been carried out on an experimental layout consisting of a continuous main line with a branch line and sidings. A Talk on *"Railway Signalling"* has been given. Arrangements are being made for a club photograph to be taken. Secretary: E. A. Wheeler, 51, Wallace Road, Copnor, Portsmouth.

Ardsley.—The Branch layout is being relaid with Hornby Steel Track. The stations have been renamed "Sheffield" and "Barnsley," and famous trains reproduced include *"The Yorkshireman," "The Thames-Forth Express"* and *"The Devonian."* Members are building a shed for use as a clubroom. The formation of a savings club and an accidents fund are under consideration. Secretary: E. Ibbotson, 16, New Street, Ardsley, Yorks.

Waterloo (Dublin).—Two members on holiday recently travelled over the Kent and East Sussex Railway, on which the Branch layout is modelled, and improvements they suggested have now been made. A new baseboard 3 ft. 6 in. in height is in preparation, and a model bridge is to be constructed. Special train services were run in connection with the annual "hop-picking season." Secretary: S. B. Carse, 38, Oakley Road, Ranelagh, Dublin.

Northampton.—An outstanding event was a visit to Liverpool. After a trip on the Overhead Railway members inspected the Cunard White Star liner *"Scythia,"* and the afternoon was spent in the Meccano Factory, where members enjoyed tea. A fitting conclusion to the trip came at Crewe, where the red and gold streamlined locomotive No. 6226 *"Duchess of Norfolk"* took over the train in which the return was made. The season's cricket fixtures have been completed, the last few matches played proving very enjoyable. Secretary: P. C. Collier, 33, Sandringham Road, Northampton.

Hornsea.—Regular meetings have been held, and a variety of trains run on the Branch layout. A large excursion crowd from "Windsor" to "Hornsea" taxed the ingenuity of the traffic department, but the service was successfully run. On another occasion, "Windsor" goods yard became so busy that they had to call in extra help! All trains were run strictly to timetable. Secretary: P. Richardson, "Summerleigh," Esplanade North, Hornsea.

Keighley and District.—Rolling stock, lineside accessories and a special baseboard have been constructed. An incline has been made from track level to an overhead station, with an appropriate retaining wall, and interesting working has been carried out on it, especially in connection with gravity shunting. Both timetable and special working have been employed. Members paid a visit to Utley Bridge, on the L.M.S. main railway line from London, and there saw several famous expresses. Secretary: N. Birtwhistle, 9, Bronte Street, Keighley.

S. Simmons, secretary of the Acton H.R.C. Branch No. 308 since its inception in June 1936. Chairman, Mr. J. H. Statham. This go-ahead club follows a varied and attractive programme, which includes talks and lectures as a diversion from track operations. Regular outdoor meetings have taken place during the summer, and several motive power depots and running sheds were visited.

Acton.—The Branch had to vacate their clubroom early in the summer, so no indoor meetings have been held. It is hoped to obtain a new clubroom for the commencement of the Winter Session. Visits have been paid to places of railway interest, and various surprise meetings have been held. Darts and cricket matches have been played and a trip made round London on trolley buses. Secretary: S. W. Simmons, 7, Alfred Road, Acton, London W.3.

Folkestone.—During the summer members have prepared and painted a shed for use as a clubroom. The Branch layout is being permanently laid down in it, and constructional work will then be started on stations, bridges, a goods depot and various other buildings, plans of which have been drawn. A model schooner has been built and tried out with success. A visit to Hythe is being arranged. Secretary: F. E. Saunders, 79, Dover Road, Folkestone.

The Abbey (Bury St. Edmunds).—At track meetings members take charge of operations in turns, so that each may become proficient in control work. Evening rambles have been held, and at one meeting an outdoor track was laid down. A visit was paid to the L.N.E.R. locomotive shed at Bury St. Edmunds, where members enjoyed a ride on the footplate of a 4–4–0, each taking his turn in replenishing the fire-box. A Lecture has been given on *"The Flying Scotsman,"* this being the first of a series contributed by the secretary. The Photographic Section is very active. Secretary: M. D. Forster, 2, Crown Street, Bury St. Edmunds.

Edgbaston.—Very successful meetings have been held, with good attendances, and timetable working has been tried out. The track is to be laid on a raised baseboard. Two sections, meeting on different nights, are being formed. Several cricket matches have been much enjoyed. A Lecture has been given by Mr. L. Strudwick on *"The Ravenglass and Eskdale Miniature Railway."* Secretary: R. L. Teare, 531, City Road, Edgbaston, Birmingham 17.

Proposed Branches

The following new Branches of the Hornby Railway Company are at present in process of formation, and any boys who are interested and desirous of linking up with this organisation should communicate with the promoters, whose names and addresses are given below.

Cambridge—F. W. Hassall, Fosters Mill Cottage, Station Road, Cambridge.
Ilford—B. W. Kent, 183, Balfour Road, Ilford, Essex.
London—B. D. Emson ,40, Wilmot Road, Tottenham, London N.17.
London—D. Mitchell, 244, Francis Road, Lenton, London E.10.
Richmond—J. Thorn, 41, Peldon Avenue, Richmond, Surrey.

Branches Recently Incorporated

352. Portsmouth—Mr. N. E. Simmonds, 45, Meon Road, Milton, Portsmouth.
353. New Zealand—Mr. A. J. Heron, 86, Endeavour Street, Lyall Bay, Wellington.

SETS (Postage Extra)

4	Antioquia ...	... 2d.	10	Guatemala...	... 3d.
20	Argentine ...	... 3d.	15	,, ...	... 5d.
40	,, ...	... 7d.	20	,, ...	... 8d.
10	Bolivia ...	... 4d.	25	,, ...	... 1/-
20	,, ...	... 9d.	5	Honduras ...	... 3d.
10	Brazil ...	... 3d.	5	Mexico ...	... 2d.
15	,, ...	... 5d.	10	,, ...	... 5d.
10	Chili... ...	... 3d.	10	Nicaragua ...	... 3d.
15	,, ...	... 6d.	15	,, ...	... 5d.
10	Colombia ...	... 3d.	20	,, ...	... 8d.
15	,, ...	... 8d.	5	Paraguay ...	... 2d.
10	Costa Rica...	... 4d.	10	,, ...	... 5d.
15	,, ,, ...	... 8d.	15	,, ...	... 8d.
10	Cuba ...	... 3d.	5	Peru	... 2d.
15	,, ...	... 5d.	10	,, ...	... 5d.
10	Ecuador ...	... 3d.	10	Salvador ...	... 3d.
15	,, ...	... 5d.	15	,, ...	... 5d.
20	,, ...	... 8d.	20	,, ...	... 8d.

J. RUSSELL,
23, SHANKLIN DRIVE, WESTCLIFF-ON-SEA.

Exchange Club. Send books 50% on your prices. Books sent monthly. J. A. Bryan, Ashbocking, Stokes, Suffolk.

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100 DIFFERENT STAMPS FREE to applicants for ½d. approvals. Cox, 14, Broadmead Av., Worcester Park.

ONE THOUSAND STAMPS ON APPROVAL

From which you may select any 100 for 3/-. This selection is not made up of the very commonest varieties, but contains stamps catalogued at 1/- each or more. (I do not sell less than 100.)

Special Offer: Packet of Mint British Colonial, catalogue value at least £1, post free, 5/-.

A returnable deposit of £1 is required from overseas applicants.

H. HARDY, "Hoyland," Potter Heigham, Norfolk.

SEND POSTCARD ONLY — FREE!

Wonder packet of 101 Different Stamps, including long sets of Pictorial and European Stamps, Colonials and "hard-to-get" issues, many obsolete. Sets of Bohemians, Austrian and British Colonials. Stamps depicting Queen Elizabeth and King George, large picture stamps and temporary issues. You cannot afford to miss this extraordinary offer, which space does not permit us to enhance further. Finally, we include our new 1938 Catalogue, list of further similar 40 gifts and large new issue unused Cayman Isles Stamp. Just send postcard (no money) requesting approvals.

LISBURN & TOWNSEND LTD. (Dept. M.M.), LIVERPOOL 3

FREE WONDERFUL 1938 OFFER 20 NEW ISSUES AND NOVELTIES

Including **ANDORRA** (new), Belgium, Canada, Denmark, **FRENCH EQUATORIAL AFRICA** (pictorial), **GRENADA (King George VI)**, **GREECE (Bull vaulting scene)**, Jugo Slavia, **KELANTAN** (Sultan Ismail), **MOZAMBIQUE CO. (Giraffe)**, **MOROCCO AGENCIES (King George VI, already obsolete)**, Turkey, etc. I will send this collection absolutely free to all stamp collectors **sending 2d. postage** (abroad 4d.).

G. P. KEEF, WILLINGDON, EASTBOURNE, ENGLAND.

FREE! 5 REIGN & COMMEMORATIVE BRITISH COLONIAL PACKET

25 different, inc. Q. Victoria, K. Edward VII, K. George V, K. Edward VIII, K. George VI, Jubilee and Coronation. All Br. Cols. This worth-while and as described set ENTIRELY FREE. Ask Approvals enclosing postage only. ALSO FREE EXCHANGE FOR YOUR DUPLICATES. Dealers supplied.

ASTLEY & CO. (M3), NEWBOLDS, WOLVERHAMPTON

THE 'ORIENTAL' PACKET

A really marvellous packet containing 46 fine stamps, beautiful pictorials from **ORIENTAL COUNTRIES ONLY**—Temples, Mosques, Pyramids, Minarets, desert scenery, etc. **SPANISH MOROCCO, 2 IRAQ,** unused **OTTOMAN EMPIRE** (obsolete), Set of **10 TURKEY** including old and new issues, Sets of **5 EGYPT, 4 PALESTINE, BRITISH MOROCCO** (Geo. VI), **5 GEORGIA** (quaint-looking stamps usually sold for 5d.), Set of **5 ALGERIA** (pictorials), Set of **4 FRENCH MOROCCO** (large pictorials), Set of **6 TUNIS** (including bi-coloured Parcel Post). The last three sets alone would sell singly for 1/2—and 2 beautiful **SYRIA.** This is the finest packet for the money I have ever offered. Price 4½d. only. Postage 1½d. (abroad 3d. extra). Purchasers of the above asking to see my approval sheets will be presented with **10 PERSIA.** In addition to this senders of addresses of stamp-collecting friends will receive set of **6 POLAND. BARGAINS:** 20 Airpost, 6d., 100 B. Colonials, 1/-, 6 Triangulars, 7d., 20 Brazil, 6d.

H. C. WATKINS (M. Dept.), GRANVILLE ROAD, BARNET

THE FIRST STAMP Ever Issued

(British 1840 Penny Black) for P.O. **3/6.** It is guaranteed genuine in every respect. Its companion stamp (1840, 2d. blue) for a further **5/9** (cat. 17/6)! Other "Classics" which every Collector should have are the **Cape of Good Hope Triangulars;** we offer 1d. rose (cat. 40/-) for **12/6;** 4d. blue (cat. 15/-) for **5/-;** and 6d. pale lilac (cat. 40/-) at **15/-.** Superb approvals of any country against approved English References or a deposit. **Full Lists Free.**

NORRIS & CO. (Dept. M), Norwood, London S.E.19.

GREAT BRITAIN

Postally used 2/6 and 5/- King George V, cat. 2/7, sent free to all genuine applicants for approvals enclosing 2d. postage. Only one gift to each applicant.

Mention "Meccano Magazine."

R. D. HARRISON, Roydon, Ware.

SUPER PICTORIAL PACKET FREE to approval applicants. Postage 1½d. Cecil, 24, Cromer Villas Road, S.W.18.

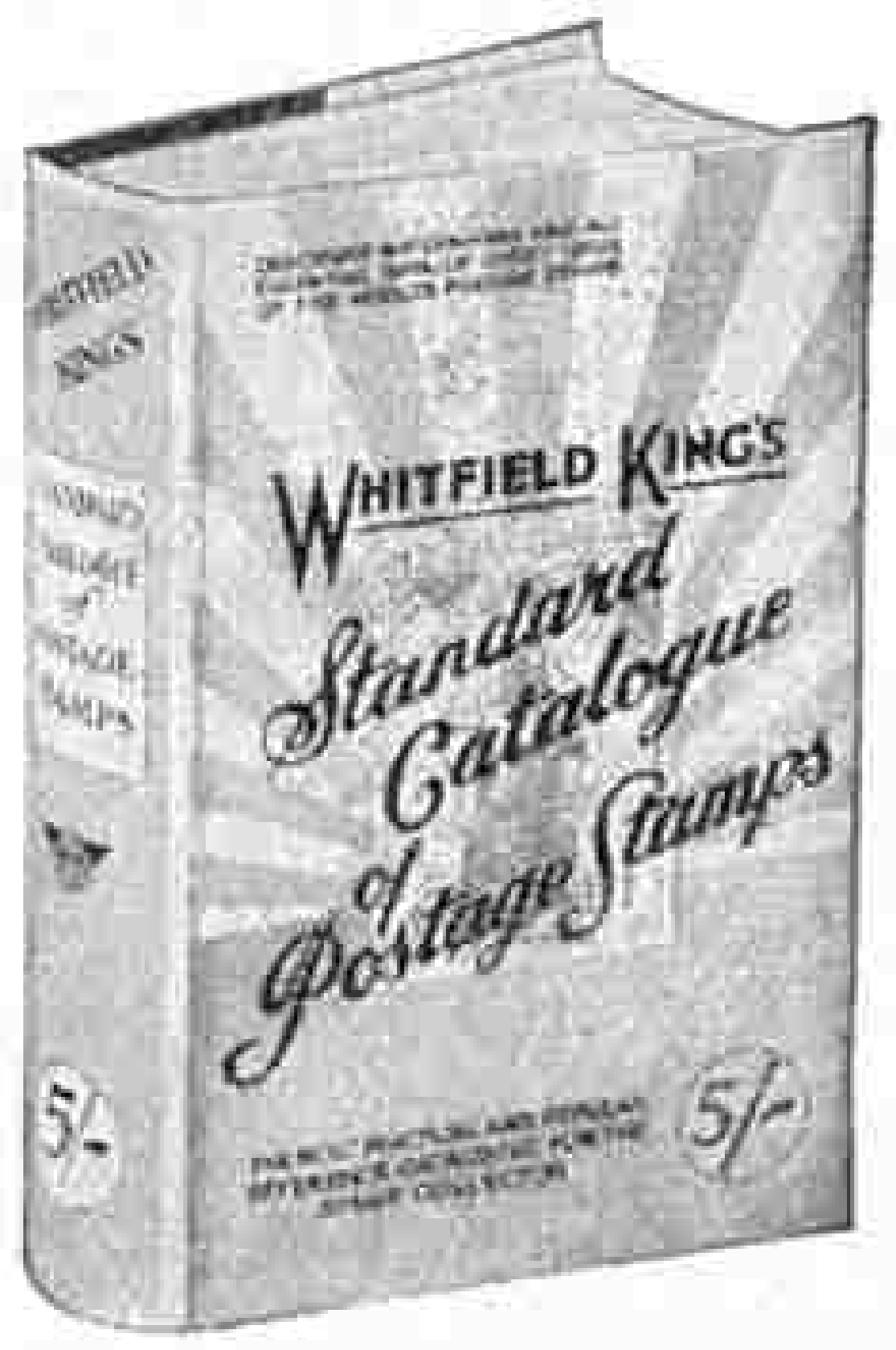
SPECIAL OFFERS

FREE to genuine approval applicants enclosing 2d. for postage (4d. abroad) — **4 NIGERIA K.G.V. OBSOLETE PICTORIALS.** Please state interests and whether beginner or medium collector. **SPECIALITY—NEW ISSUES**—all illustrated in stock **11 MOROCCO K.E. VIII Mint 1/3. 7 TURKS. & C. K.G.VI** Pict. ½d.—3d., **1/3; 5 S. LEONE** to 3d., **1/-; 6 MONTSERRAT K.G.VI** Pict., **1/3; 6 DOMINICA K.G.VI** to 3d., **1/3.**

T. R. HUGHES (P.T.S.),
'IBIS COTTAGE,' AMERSHAM, BUCKS.

ASIATIC

Two more FREE GIFTS this month. **FIRSTLY,** a large packet of stamps from the largest and most interesting continent, **ASIA.** Every stamp in this lot comes from some part of this mystic continent. Many used. These distinctively designed emissions will add a genuine Eastern flavour to your collection. In contrast, our **SECOND** gift is up-to-date for those who like moderns. It's a small collection of new reign issues of **KING GEORGE VI** and all bearing His Majesty's portrait. **BOTH GIFTS ABSOLUTELY FREE** by requesting approvals and enclosing 2d. stamps (abroad 6d.) to: **WINDSOR STAMP CO. (Dept. M), 59, LEE ROAD, BLACKHEATH S.E.3.**



ESTABLISHED 1869

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THE STANDARD CATALOGUE OF POSTAGE STAMPS OF THE WORLD NEW 1939 EDITION

900 pages. 7,400 illustrations.

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Postage Sixpence extra.
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All the World's Postage Stamps clearly described, including the new King George VI and the interesting Spanish Civil War issues.

An indispensable aid to stamp collecting. Will help you to obtain the utmost pleasure and interest from this popular hobby.

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Comprehensive price lists of stamps and albums free on request.

WHITFIELD KING & CO., IPSWICH, ENGLAND.

FREE 15 COMMEMORATIVES

To all applicants for our approval sheets enclosing 2d. to cover cost of postage we shall send this exceptional packet including stamps of Hungary (St. Stephen), Newfoundland (Coronation 1911), Canada (Confederation), Denmark (Hans Anderson), U.S.A. (Recovery Act), Ecuador (Darwin) and many other interesting stamps, also Gem Case, packet of stamp mounts, and our illustrated PRICE LIST of Sets. This offer holds good for 30 days, abroad 60 days.

WRITE NOW to **ERRINGTON & MARTIN, Dept. 285, SOUTH HACKNEY, LONDON E.9.**
Established 1880.

FREE Set 3 Brazil, Perforation Gauge, 50 Packet Stamps. Send 2d. Request approvals. Colley, 72, Tweedy Road, Bromley, Kent.

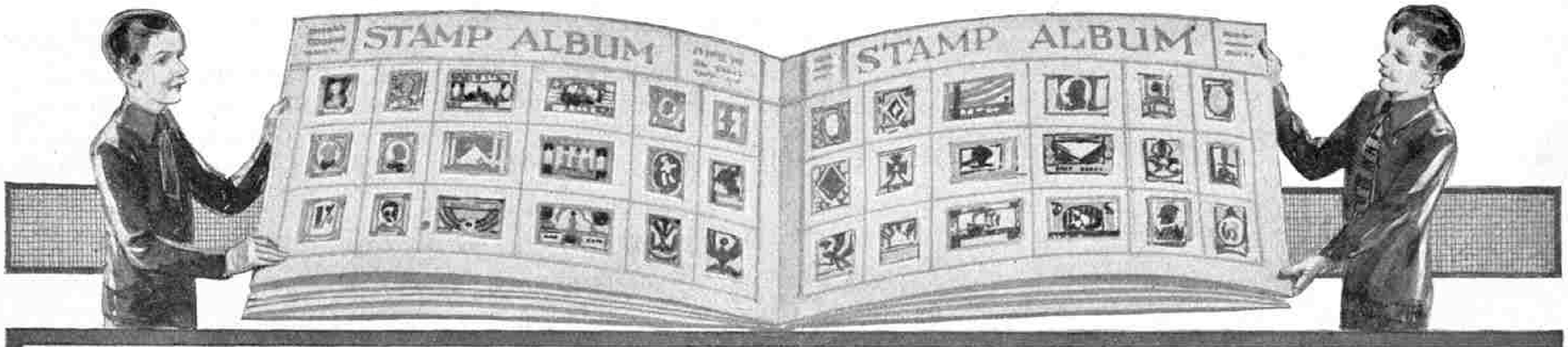
IRAN MINIATURE SHEET or 7 Hungary St. Stephen 2½d. Approval applicants. 50 Soviet Russia 1/-. Dawes, 12a, The Grove, Addlestone, Surrey.

FREE 16 FOREIGN and 14 COLONIALS CAT. 11/6

THESE TWO WONDERFUL PACKETS, VALUED AT OVER 2/6, FREE to every **genuine** applicant enclosing 2d. postage (abroad 6d.) for my **world-famous "VALUE"** approvals, containing only perfect stamps at very low prices which enable you to buy **TWO** stamps instead of one. **Just look at the contents:** **5 JUBILEE and CORONATION** issues, scarce used pictorial **high values** from **ALGERIA, MOROCCO, TUNIS, LUXEMBOURG,** beautiful **NEW ISSUES** from **ITALIAN EAST AFRICA** (first stamp ever issued), **AUSTRALIA, GREECE, MONACO, PICTORIAL INDIAN STATES,** large **ITALIAN COMMEMS., rare** used **American high value,** stamps from out-of-the-way Hyderabad, Jamaica, Gwalior, Travancore, **finally,** a superb **set of 6 Boy King Peter.** You remember my **famous New Year's offer, this** is even **better.**

PHILIP COCKRILL, 13, MONTRELL ROAD, STREATHAM HILL, LONDON S.W.2.

For other stamp advertisements see pages 598 and xiv



STAMP COLLECTING

WHAT TO COLLECT

THE question of what to collect is one that is constantly being asked by young stamp collectors, especially those who are ambitious but have a limited allowance of pocket money. Such boys want to know whether it is worth while trying to form a general collection, or if it would be better to take one country or some branch of stamps, and ignore all others right from the beginning of their collecting careers.

Invariably, our advice is in favour of general collecting at the outset, even in cases where the collector has an idea of the direction in which he would like to specialise. He cannot do this happily until he has let his fancy roam at large around the world of stamps, and has found some feature that has interested him more than any other. Then is the time to commence specialising.

MONTSERRAT
1d
SEA ISLAND COTTON
1d

Most specialists confine their activities to the stamps of one country or to a group of countries, but it is not essential to fix on a country. There are many other features of stamp collecting that offer equally good opportunities and at the same time permit the collector to search the whole world for his material.

Stamp designs have broadened their appeal in recent years, and are used so largely as pictorial propaganda, setting out the history, the geography, the scenic attractions, or the industrial enterprise of their countries, that whole stories can be built up on them. For example, there are stamps that make it possible to describe in full the development of aviation, of railways, of ocean travel by sail and steam and oil, of the world's navies and of bridge-building. These are subjects for collectors who are interested in engineering. Students of natural history will find hosts of stamps showing animals, birds, reptiles, fish, trees and flowers. There are maps and pictures of famous ports for the geographical student, and stories of opera, portraits of famous musicians and even snatches of manuscript for those who are musically minded; while those who revel in the great men and incidents of history can find as much material as they can handle in a lifetime.

1D
VIRGIN ISLANDS

Collecting air mail stamps and covers is a very popular form of specialisation. Many enthusiasts take the view that "the cover's the thing" and collect only complete envelopes, preferably those used on first flights. Such covers tell a complete story in themselves. In addition to the normal postmark cancelling the stamps on the face of the cover, which shows the date of posting, they usually bear a back stamp showing the date of arrival at their destination, and in most cases there is also a cachet, usually a pictorial device giving brief details of the flight. The cachet, in fact, almost serves as a certificate that the cover has been carried on that flight.

MONTSERRAT
3d
3d

Another interesting specialist subject is that relating to "meter franks," a system of prepaying postal charges that is gaining in popularity with business houses throughout the world. Briefly explained, a "meter frank" is an impression that serves the purpose of a postage stamp, and is printed on the envelope by a machine that has previously been set by the postal authorities to print franks up to an agreed amount, paid in advance by the user of the machine. When this sum is exhausted the machine automatically locks itself. The impression includes the registered number of the machine, and in most cases there also is a neat advertising device, giving the name of the user and the brand name of his products, or possibly an advertising slogan.

LIAISON AÉRIENNE
MARSEILLE-BEYROUTH
POSTE AÉRIENNE
10P
RÉPUBLIQUE LIBANAISE

This form of postmark advertising must not be confused with the "slogan postmark" that to-day is commonly added to the ordinary dated cancellation to focus attention on some matter of national importance. Thus in Britain we get postmarked exhortations to *"Post Early for Christmas"* or *"Save Time by Telephone."*

National propaganda postmarks form an interesting special subject that has attracted many stamp enthusiasts. Some collections of this kind are very extensive. The commonest subjects in them are those relating to the advantage of using the telephone—New Zealand alone has used nearly 30 different slogans in this connection—early posting, and the use of air mail. Others are slogans extolling the merits of national products, coffee from Guatemala for example, and tourist facilities. Many slogans, notably those from Holland, are accompanied by quite elaborate pictorial devices.

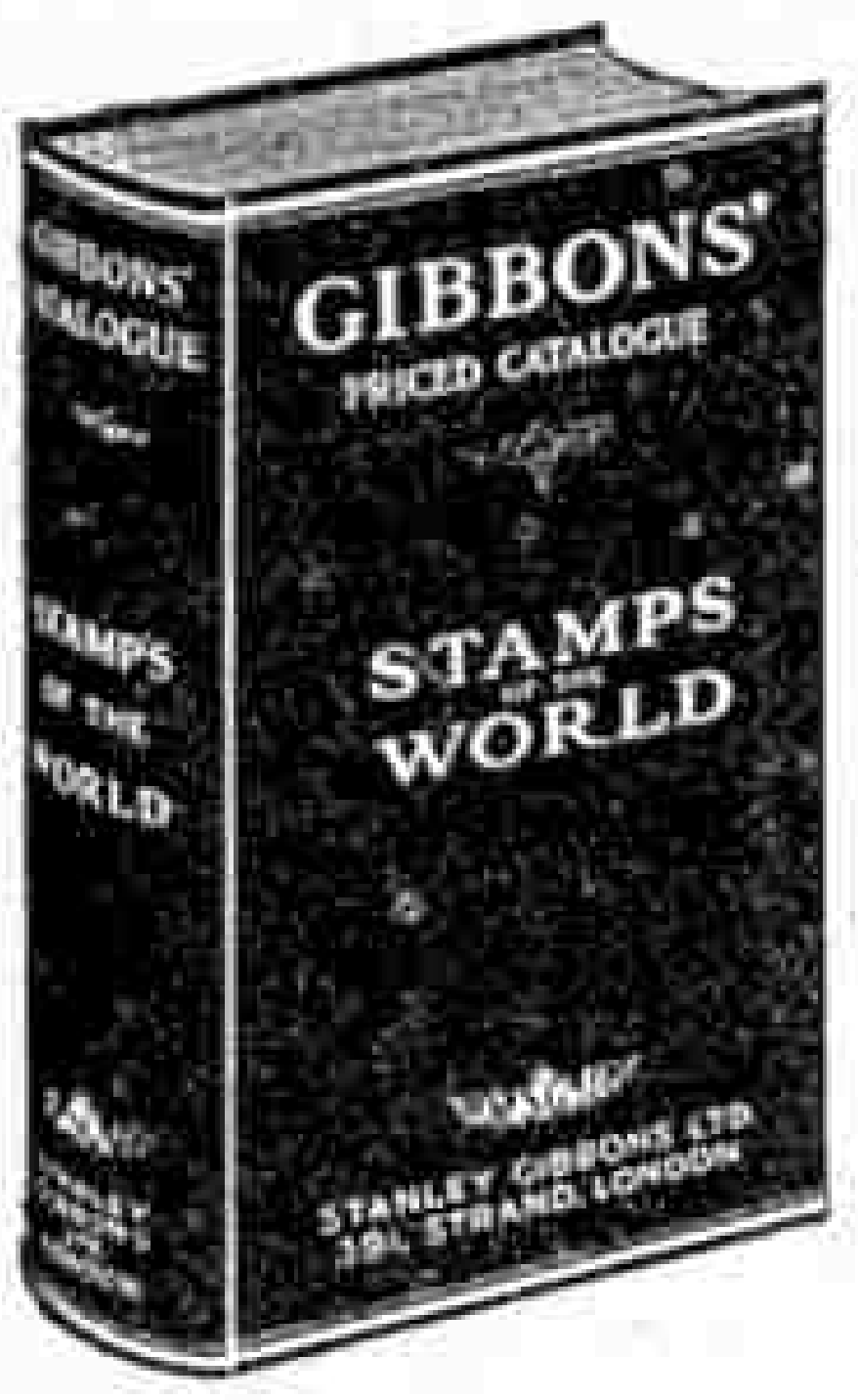
It is difficult to realise how interesting this subject is until the material available has been seen. Any reader starting to collect slogan postmarks now would find it difficult to get early material, but he would find it well worth while to make a start if he can obtain envelopes from foreign mail. Whole envelopes can be retained in such a collection, but a better plan is to cut out the corners bearing the stamps and postmarks, and to mount them on light cards. This system requires rather less space.

These suggestions by no means exhaust the list of specialist subjects to which young stamp collectors can turn their attention, but they are sufficient to indicate its great range. Any reader who contemplates trying to work on these lines and who would like to know more about any particular scheme, and how to set about it, should write to the Editor who will be delighted to help him.

Indeed, that offer of help is extended to all our stamp collecting readers. The *"M.M.'s"* stamp pages are designed to assist young stamp collectors to get the best out of their hobby, and any reader who encounters a stamp problem that he cannot solve for himself, is invited to lay his difficulty before the Editor and obtain his advice.

MONTSERRAT
2d

To be UP-TO-DATE in Stamp Collecting you must have one or both of the NEW 1939 STANLEY GIBBONS' CATALOGUES



NOW READY

"BIG" GIBBONS 1939

Best and most detailed catalogue, essential to every keen collector. Brand-new feature—"Simplification Tables"—makes it easy for **all** collectors to use. 1,924 pages, 22,105 price alterations, 2,367 new issues added. ALL THE WORLD IN ONE VOLUME. **16s.**

Post. extra, U.K. 6d., abroad 1/4

READY OCTOBER 18th

STANLEY GIBBONS' SIMPLIFIED CATALOGUE

The world's most wonderful and most popular five-shilling catalogue. Lists all the world's stamps (59,028) in simplest form, including the many fine King George VI new issues. No less than 7,816 stamp illustrations. Price **5s.**

Post. extra, U.K. 6d., abroad 1/2

SPECIAL. The popular CORONATION STAMPS in booklets ON APPROVAL. Ask to see them.

STANLEY GIBBONS LTD.
DEPT. S.15, 391 STRAND, LONDON, W.C.2

FREE + SETS + FREE

2 HOLLAND (Scouts Jamboree). **3 NIGERIA 1935** (Pictorials). **4 ROUMANIA** (Large Portraits). **5 SPAIN** (Mint Goya Comms.) **6 NORWAY 1926** (Lions) and sets of Australia and Canada.

FREE ONLY to those who ask for approvals and enclose 2d. postage and packing (overseas or without appros. 1/-).

HELY HUTCHINSON (M1), Hurrock Wood, Kents Bank, Grange-over-Sands, Lancs.

NO GIFTS — VALUE IN THE STAMPS

1,000 Unsorted Stamps for 1/6, post free. Three packets for 3/9, post free. Chance of a find in every packet. Try one.

APPROVALS — NO DISCOUNT

but super excellence in the stamps, ½d. and 1d. and higher values. Postage one way only. You can keep them seven days. Postal business only.

H. K. SYKES (Dept. A), Stamp Shop, Chapel-en-le-Frith.

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5 SETS — FREE!

4 ICELAND, 4 rare MANCHUKUO, 4 MOROCCO (large views), 5 MOZAMBIQUE Pictorials and 6 TUNIS. These 23 attractive stamps free to collectors who ask to see our bargain approval sheets. Send 1½d. for postage (abroad 9d.)

J. STOCKTON & CO.,
53, BRIDGWATER DRIVE, WESTCLIFF-ON-SEA.

UNUSED 1/- GREAT BRITAIN 1864

and 6d. U.P.T. Co., CANADA JUBILEE, 10 NEWFOUNDLAND (cat. 2/1), Queen Mary, George V, S.W. Arm Trinity, Publicity issue Newfoundland and Labrador, S.S. Caribou Codfish, 3 NIGERIA 1921/32, the lot 6d. post free. GRAND SET 14 UNION S. AFRICA 1926, E. and D. values ½d., 1d., 2d., 3d., 4d., 6d., 1/- (cat. 2/4), bargain 4d. Collection, 30 NEWFOUNDLAND only 2/6. Collection 51 CANADA inc. Jubilee and NOVA SCOTIA 1860, 8½c. green only 4/-. **N. T. Hillier, "Stamp Club," Horsmonden, Kent.**

FREE! EXHIBITION PACKET containing 50 different stamps, including **ANTWERP 1894** and **BRUSSELS 1896 EXHIBITIONS**, etc., 250 mounts, duplicate book, and perforation gauge. Request approvals. Enclose 2d. postage. No approvals sent abroad. **A. R. DICKIE (Dept. M), 23, Winscombe Crescent, Ealing, W.5.**

SPECIAL — REQUEST

us to send you the exciting packet of stamps which we are giving **FREE** this month. It includes Centenary stamps from **EIRE** and **GREECE**; "Building" stamps from **POLAND**; a set of **HINDENBURG**; **ALGERIAN** pictorials; Postage Dues and a number of other stamps which you may be requiring to complete your sets.

This packet can be yours by sending 2d. and requesting our **BARGAIN** approvals.

THE STANDARD AND UNIVERSAL STAMP CO. (OM10),
16, Gloucester Circus, Greenwich, S.E.10.

BRITISH and FOREIGN

Choice approvals for Beginners and Advanced Collectors from ¼d. to many pounds each stamp. Bargains from 1/3rd to 1/8th catalogue.

CAMPBELL, Haldon Avenue, TEIGNMOUTH.

Choose Your Free Gift

Any of the following gifts will be given free to approval applicants who enclose 2d. for postage. Particulars will be sent of gift and bonus schemes.

GREAT BRITAIN 'POACHED EGG' VARIETY.
SET OF 4 GEN. FRANCO PICTORIALS.
SET OF 6 UNUSED EXHIBITION STAMPS.
TWENTY DIFFERENT PICTORIALS including CORONATIONS, JUBILEES and SPORTS.

C. A. Masters, Broadstone, Dorset.

FREE "WORTH WHILE" COLONIAL FREE

8 Beautiful NEW ISSUES

The new issues of to-day are the rarities of tomorrow. Send 1½d. stamp (for postage) and ask to see a selection of my "WORTH WHILE" approval sheets and receive this excellent FREE GIFT.

I want you to see my stamps, when their price, condition and variety will convince you they ARE worth while.

JOS. H. GAZE, 21, Atwood Road, Didsbury, Manchester.

FREE! GEORGE VI SEYCHELLES

This month I am offering to all genuine applicants for my famous green approval books a set of 3 George VI Seychelles, a small packet of assorted stamps from all parts of the world, and IF SPECIALLY REQUESTED, 6 Transparent envelopes without extra charge. Send 2d. in stamps for postage, etc., and write NOW to:

G. KINGSMILL (Dept. M.M.), NEW BARNET, HERTS.

UNUSED AFRICAN PACKET

Fine packet of unused African stamps from Belgian Congo (river scene), Morocco Agencies King Geo. VI, already obsolete, Italian East Africa (Abyssinia, etc.), Sudan, Somali Coast, Kenya, Cameroons, a fine set of 5 Ivory Coast, new issue, inscribed in error 'Baloue Woman' for 'Baoule Woman'—one is already obsolete—and another set, only just issued, of French Guinea, Mozambique, etc., etc., 30 stamps in all, sent free to all genuine applicants for approvals enclosing 2d. postage. Only one gift to each applicant.

R. D. HARRISON — ROYDON — WARE

● FINE SETS ●

25 Air Mails	1/-	10 Iraq	5d.
10 Azerbaijan	7d.	7 Eire	3d.
50 Balkans	8d.	100 Italy	10d.
25 Belgium	2d.	10 Italian Colonies	10d.
50 ,,	6d.	25 Japan	4d.
7 Bolivia	5d.	3 Madagascar	2d.
25 Bosnia	1/4	10 Manchuria	9d.
10 Brazil	4d.	10 Mexico	4d.
25 Bulgaria	5d.	11 Morocco, Duke of Windsor	1/6
6 Burma	6d.	7 Mozambique Co.	5d.
6 Cameroons	4d.	5 Nigeria	3d.
25 Canada	5d.	25 Poland	3d.
8 Costa Rica Picts.	9d.	11 Azores & Angola	6d.
6 Ecuador, Giant Size	7d.	1 Russia, cat. 2/6	1d.
14 Coronations	1/-	10 Vatican City	6d.
1 Germany Hitler	5d.	5 Wallis & Fatuna	3d.
5 Greece Classics	3d.		
4 India Jubilee	6d.		

Special Offer—One of each of the above, 8/3.
Postage always extra.

MICHAEL HERBERT,
88, Edinburgh Road, Walthamstow, London E.17.

GENUINE BARGAIN

75 Different Foreign and Colonial Stamps selected from Collections presented to Hospital. Send 6d. and addressed envelope (unstamped) to:

SECRETARY,
Memorial Hospital Hall, Woolwich, LONDON, S.E.18.

IRELAND

Stamps from happy, peaceful Ireland, that you will be proud to own.

Superb collection of 40 fine stamps (over 30 varieties), including scarce 1922 provisionals, handsome commemoratives, permanent issue complete to 1/-, Postage Dues, etc. Also complete set of beautiful Constitution stamps, and handsome flown Ireland-Vatican City tri-colour aircover. Complete collection prepaid with commemoratives for 4/- ($1.00).

CHARLES F. BOURKE, A.P.S.,
ELMVILLE, FERRYBANK, WATERFORD, IRELAND.

FREE SET and 50 different to approval applicants. Gosling, 21, Powling Road, Ipswich.

Colonials and World Stamps. Approvals and Packets. Free Gift. Johns, Shirley, Salcombe, S. Devon.

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30 GEO. VI COMMEMS., etc. Free to applicants for bargain appros. Ptge. Walker, "Plaisance," Hildenborough.

"DIAMONDS"

MANY RARE STAMPS have been found by purchasers of **The "DIAMOND" Packet**, which contains approx. **1,000 UNSORTED STAMPS** from convents abroad. **1 pkt. 1/6, 3 pkts. 3/9, 5 pkts. 6/-. All post free inland.** (Postage to Colonies 3d. per pkt. extra. S. Africa and Foreign 6d. per pkt. extra. Places on Empire Airmail Route 1/- per pkt. extra.) Beware of imitations.

O. NERUSH
(DEPT. "A"), 68, TURNPIKE LANE, LONDON N.8.

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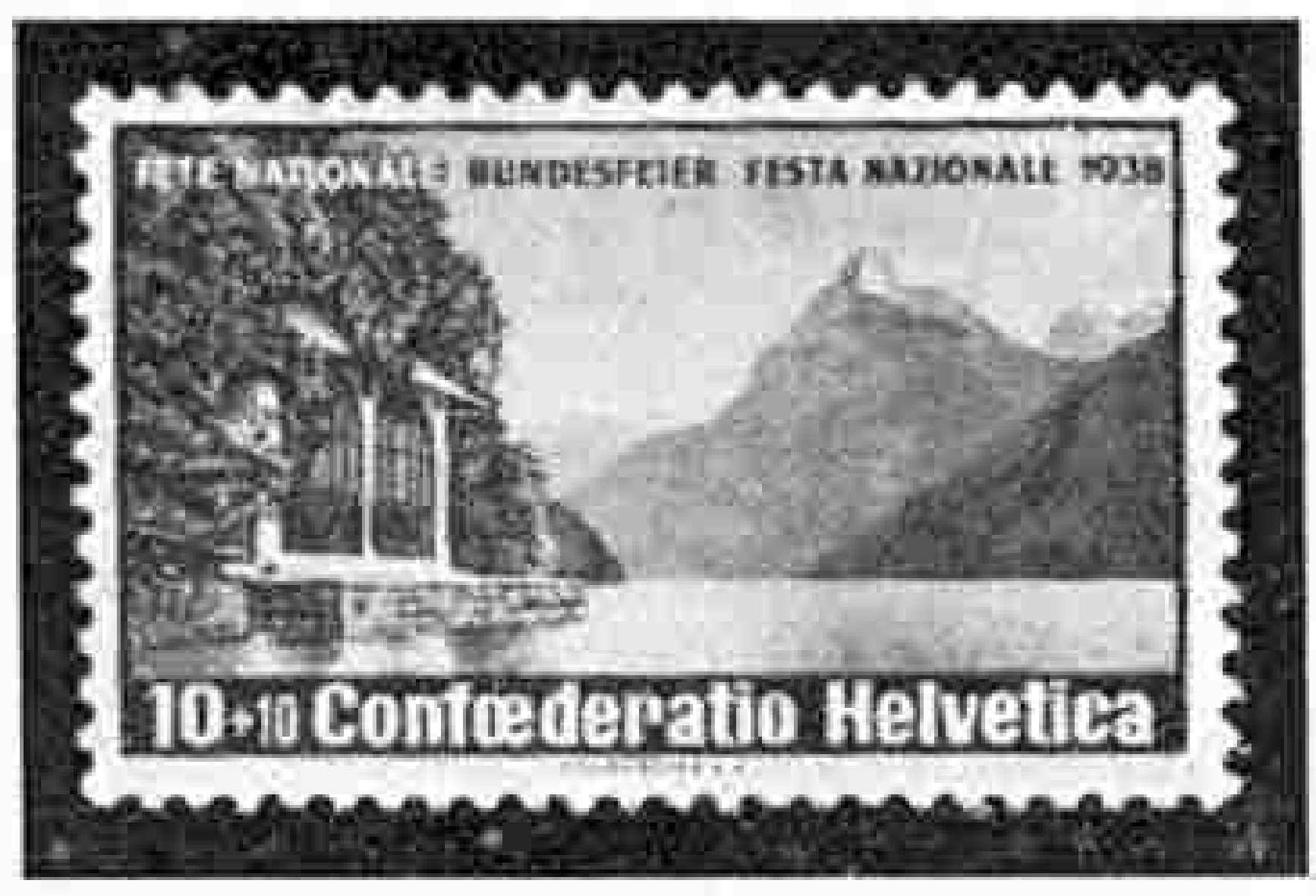
100 FINE STAMPS FREE!

In order to advertise our new series of approval sheets, we are offering a free gift packet of 100 all different stamps from all parts of the world, including many of the less common stamp issuing countries, such as EPIRUS, GWALIOR, KOUANG-TCHEOU, TRAVANCORE, TRANSVAAL, etc., and also a rare old Russian Commemorative Stamp, catalogued at 2/6. To get this packet, just send 2d. postage (abroad 6d.) and request approvals.

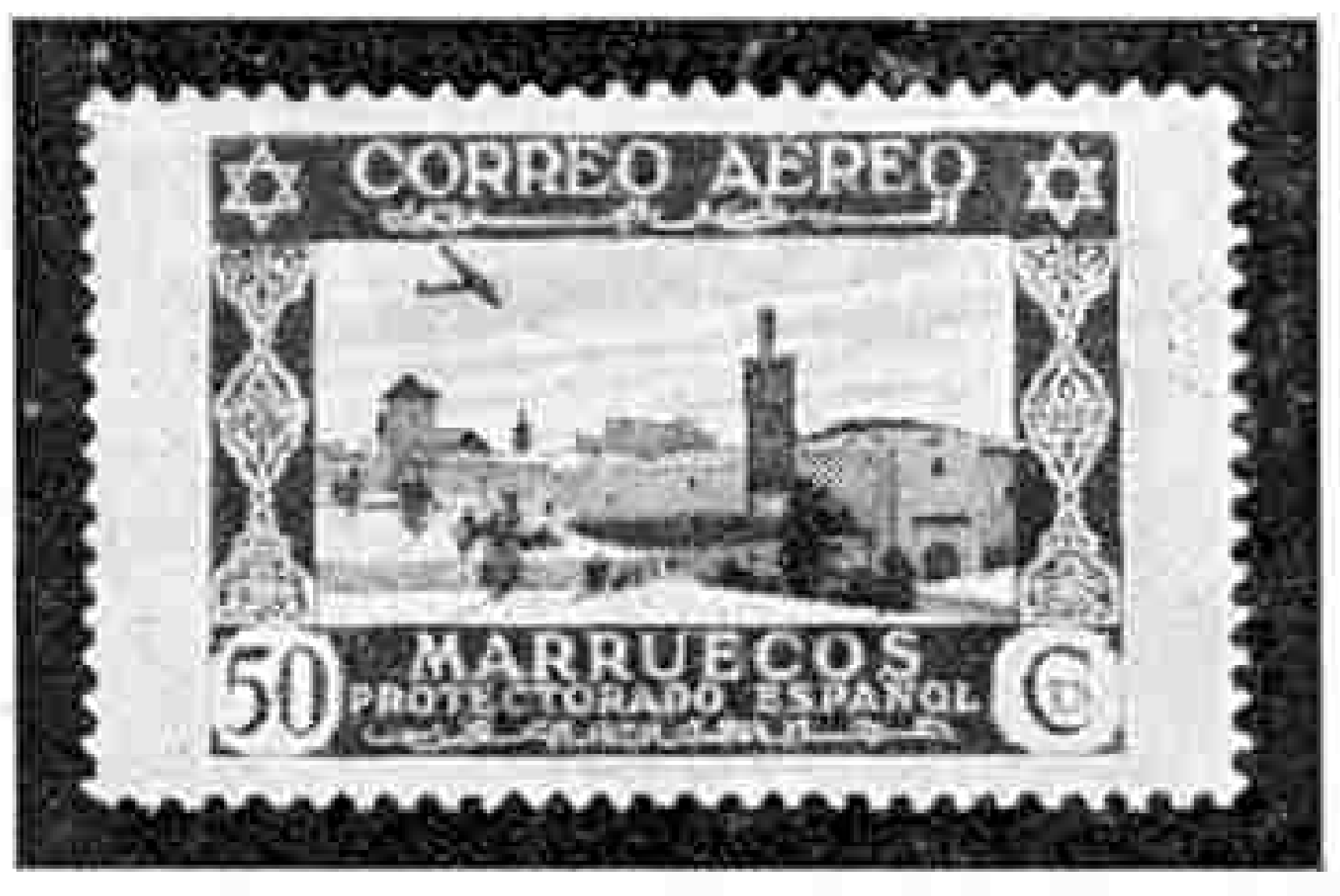
D. GREENHALGH,
Ashburn Place,
LONDON S.W.7.

For other stamp advertisements see pages 596 and xiv


FÊTE NATIONALE BUNDESFEIER FESTA NAZIONALE 1938
10+10 Confœderatio Helvetica

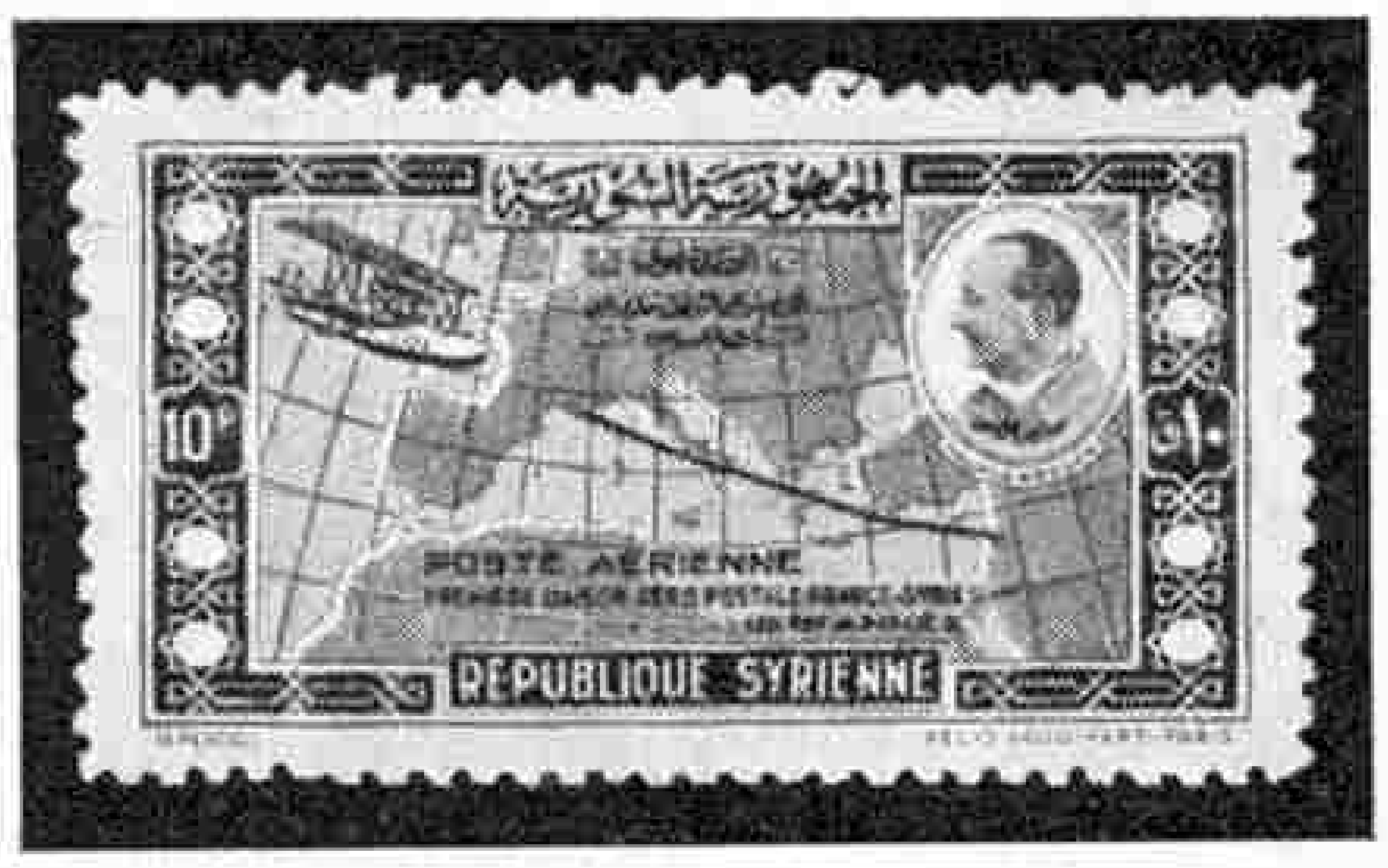
Stamp Gossip

and Notes on New Issues



New British Colonials

The issue of the Colonial new reign stamps is fast approaching completion and only a very few of the Colonies are now without their new sets.



The most interesting of this month's new issues is the set from Montserrat, Britain's Caribbean colony, famous for its lime fruit and cotton. There are 10 stamps in the set, sharing the three designs illustrated on page 597. The ½d., 3d., 1s. and 5s. values use the view of Carr's Bay, and the Botanic Research Station design appears on the 2d., 6d. and 2s. 6d. values. The best of the three designs is the view of a cotton plantation on the 1d., 1½d. and 2½d. values. The Caribbean Islands are the home of "Sea Island" cotton, fabrics from which have been widely advertised in recent years, and the choice of the three most commonly used stamps to bear this design is an interesting example of stamp propaganda.

The Arms of the colony appear in the top right corner of each stamp to balance the King's portrait.

The Virgin Islands issue consists of a single design, also illustrated on page 597, common to all the 10 stamps in the new series.

* * * *

A new series of ten air stamps has been issued for use by the Spanish post offices in Morocco. Each stamp shows a design similar to the 50c. value shown here, which depicts an aeroplane over Tetuan, but a different view is used for each stamp.

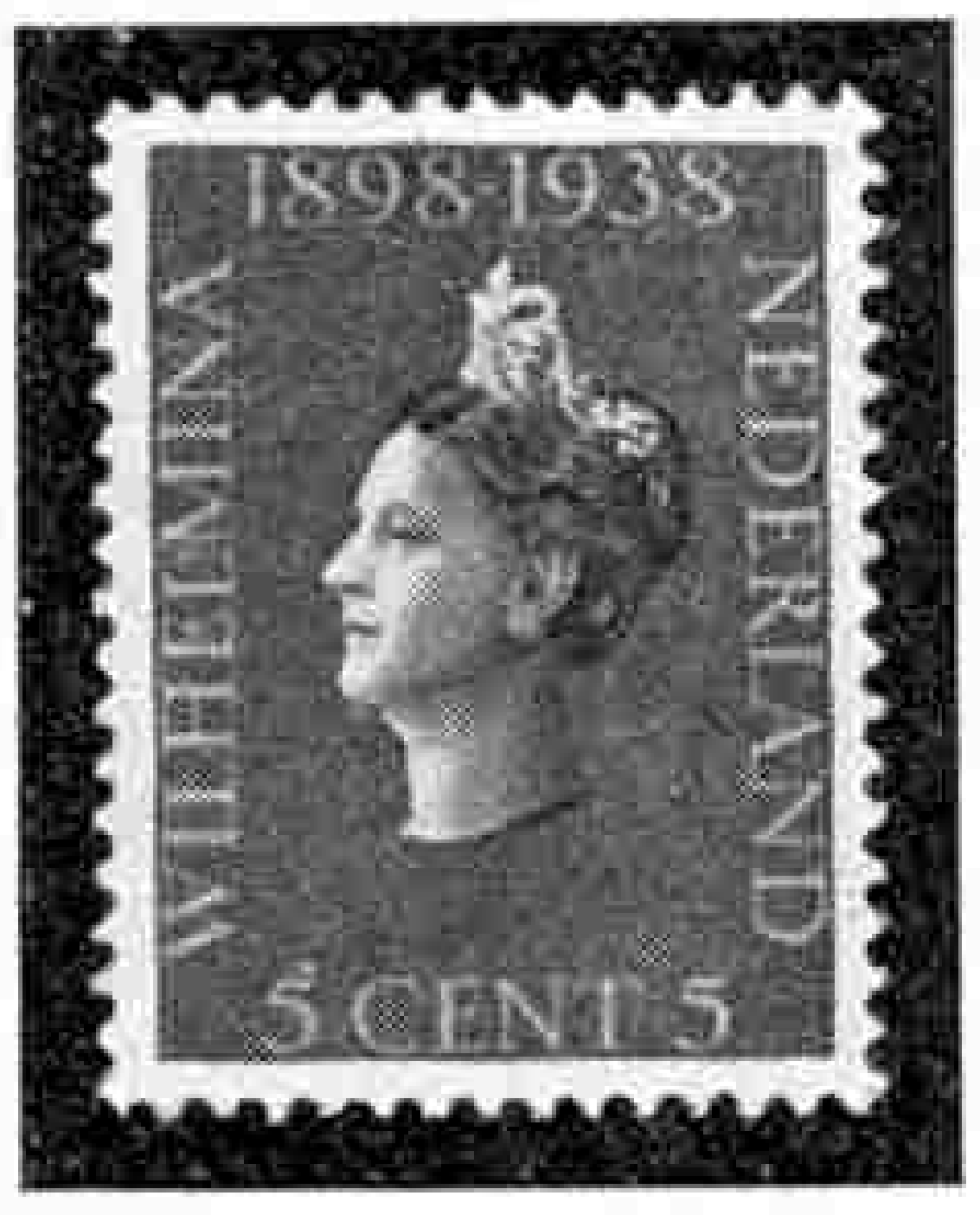
An Agricultural Commemorative

At first sight it may seem a little difficult to reconcile the appearance of a massive obelisk upon a stamp intended to mark an important agricultural commemoration, but Denmark's abolition of the villeinage system 150 years ago was so important a step in the national development that it was celebrated by the erection of the obelisk shown on the new 15 ore stamp illustrated here.

The villeinage system was an arrangement under which tenant farmers held their land only under agreement to do certain menial labour for their ground landlords.

Royal Jubilee Issues

We are indebted to several Dutch correspondents for specimens of the three stamps issued in Holland to commemorate the 40th anniversary of Queen Wilhelmina's accession to the throne. The design illustrated here is used for each of the stamps, the values being 1½c., 5c. and 12½c. The rotogravure process used in the production of the stamps has given a very charming effect to the simple design.



Another interesting Royal anniversary, the 80th birthday of Sweden's popular King Gustav V, also has been celebrated by the issue of three stamps, 5, 15 and 30 ore values, using the portrait design shown here.

King Gustav's immense popularity with his people goes far beyond the ordinary sentimental popularity that Kings are accustomed to enjoy by virtue of their exalted positions. His democratic outlook on life is the secret, and an outstanding illustration of this lies in the fact that although he has occupied the throne for over 30 years, he has never been crowned! At State ceremonies the crown rests upon a cushion at his side and not upon his head.

* * *

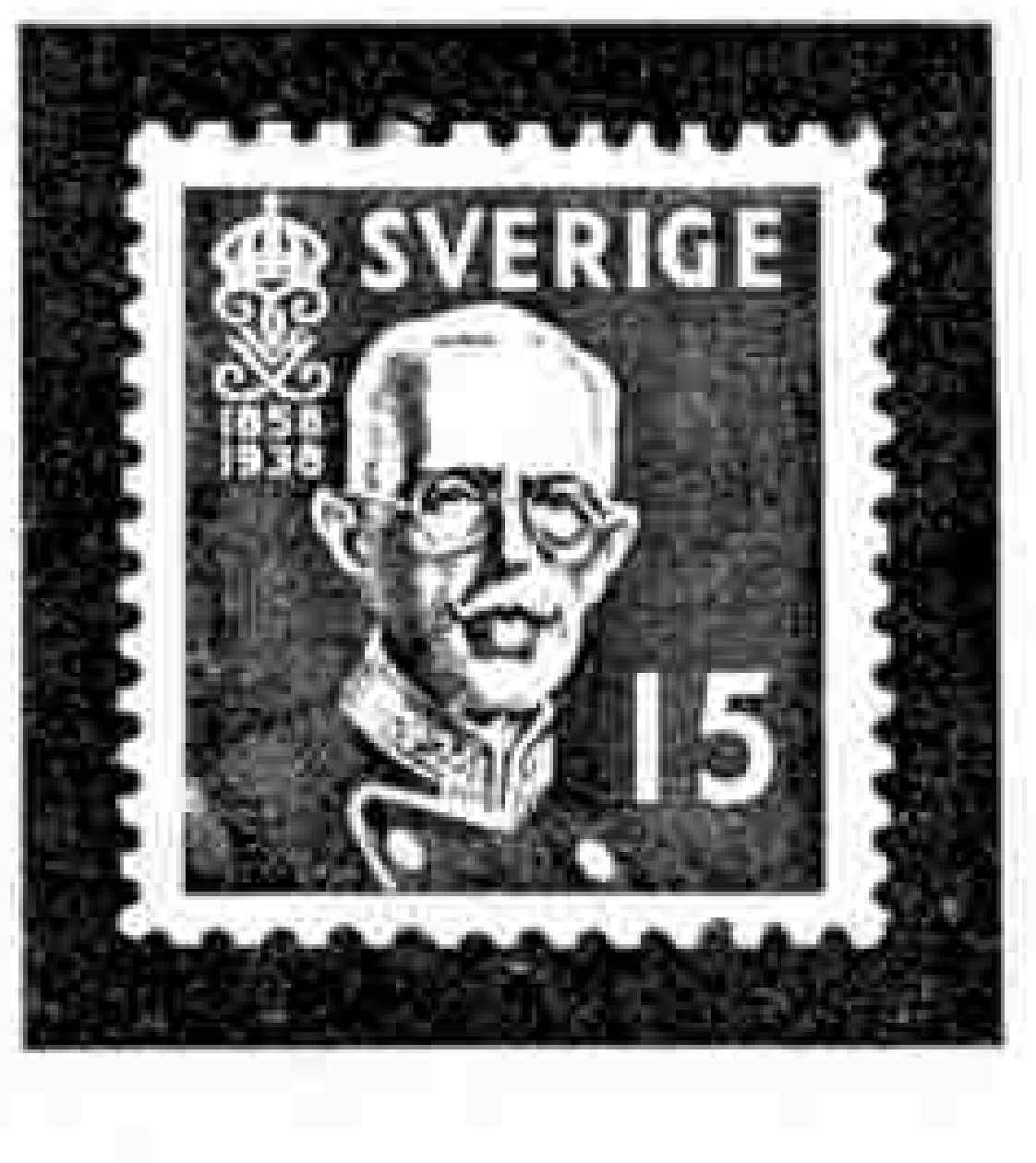
The 10th anniversary of the inauguration of the air-post service between France and its Eastern Mediterranean colonies has been celebrated in Great Lebanon and Syria, each of which has issued a commemorative air stamp as shown in the illustrations here and on page 597.

The Lebanese stamp shows an aeroplane over Beyrouth, and the Syrian issue a map of the Mediterranean Sea indicating the air route. Both stamps show also a portrait of Nogues, the pilot on the first flight.

* * *

The beautiful Swiss stamp illustrated on this page was issued in June last and sold at a premium in aid of funds for the relief of distress among Swiss subjects living abroad.

The view is of William Tell's Chapel at Burglen, to which a pilgrimage is made by boat each year to commemorate the "first Confederationist." The Chapel dates back to 1582 and is one of several erected in memory of the legendary leader.



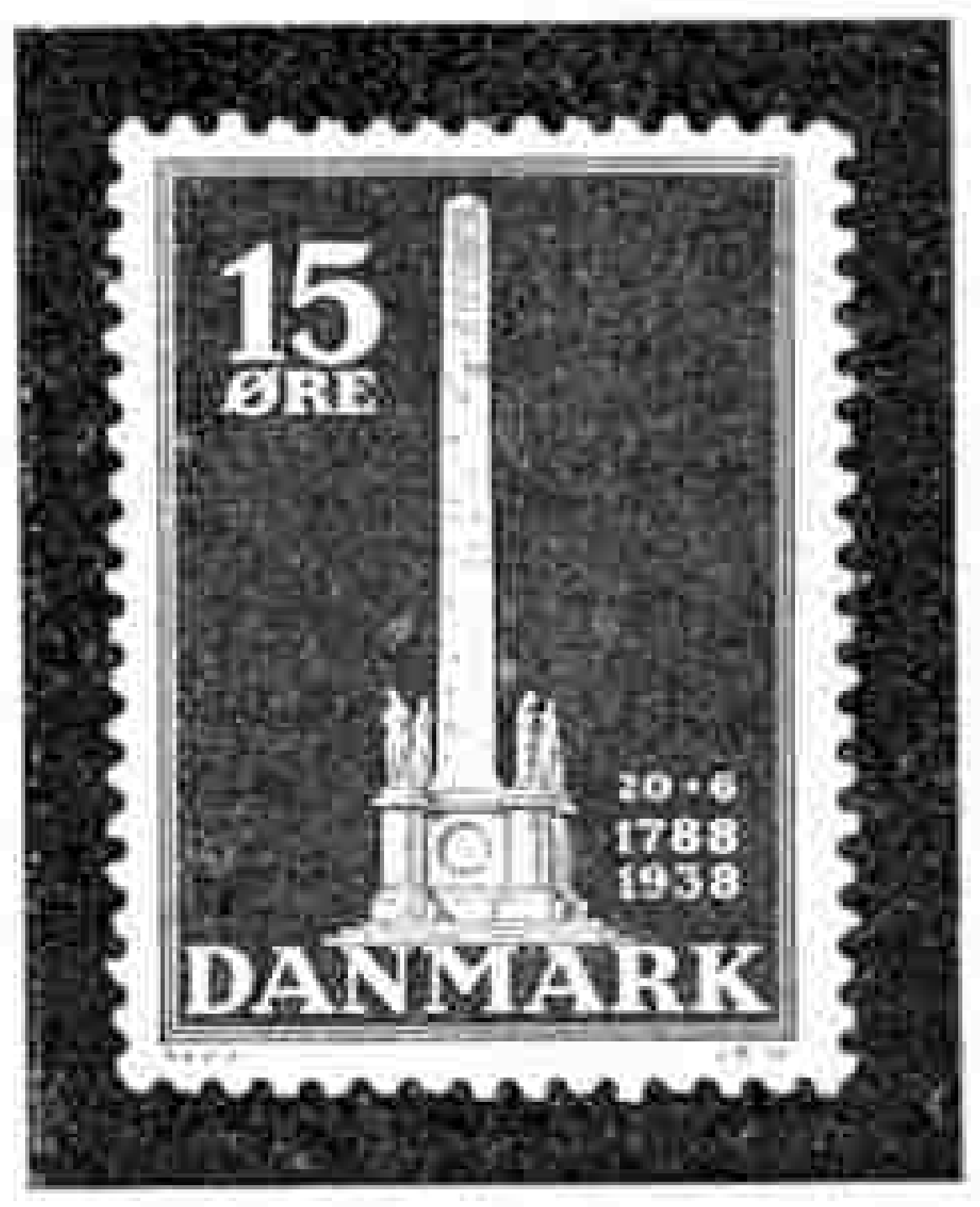
* * * *

Australia's new 9d. design, to be released on the first of this month, is a most attractive picture of the duck-billed platypus. We hope to illustrate a specimen of this stamp in our next issue.

The New Season's Catalogues

"Stanley Gibbons' Priced Catalogue of the Postage Stamps of the World." 1924 Pages. Price 16/– net. (Stanley Gibbons Ltd., 391, Strand, London W.C.2.)

Gibbons have added 55 pages to the complete catalogue to provide space for 2,367 different new stamps that have appeared since the previous edition was published. The volume is still a compact one, however.



An interesting new feature is a series of "Simplification Tables," given at the beginning of all the more complicated lists, to indicate clearly to the general collector the stamps he needs from among the numerous "specialist" varieties. This makes the volume in effect "two catalogues in one," for it can now be used with equal ease by the ordinary and specialist collectors.

Approximately 20,000 price alterations have been made, and these are of special interest as they show rising prices for the Coronation stamps, as well as for the later issues of King George V—stamps in which everyone is interested.

"Whitfield King's Standard Catalogue of Postage Stamps." 912 pages. Price 5/– net. (Whitfield King & Co., Ipswich.)

The Whitfield King Catalogue also shows considerable increase in size, for a total of 2,703 new stamps and 290 new illustrations have been added since the last edition. In an introductory note, the publishers add that these new stamps have come from Europe (1,048), Africa (480), America (498), Asia (382), West Indies (187), and Oceania (108).

The total number of stamps listed in the catalogue is 66,630. Europe leads the way with 21,325, Africa comes next with 14,532, followed by Asia with 11,951, America 11,698, West Indies, 3,877 and Oceania 3,247.

An interesting feature of the catalogue is that it complies with the new regulations laid down by the U.S. Treasury, and this is the first catalogue containing reproductions of U.S. stamps that has been available to U.S. collectors for many years.

We cannot urge too strongly upon our readers the value of an up-to-date stamp catalogue. It adds tremendously to the interest of collecting stamps and serves as a guide through most of the hobby's problems. Without a catalogue the collector is working blindly and in similar case to the mariner without a compass—all "at sea."

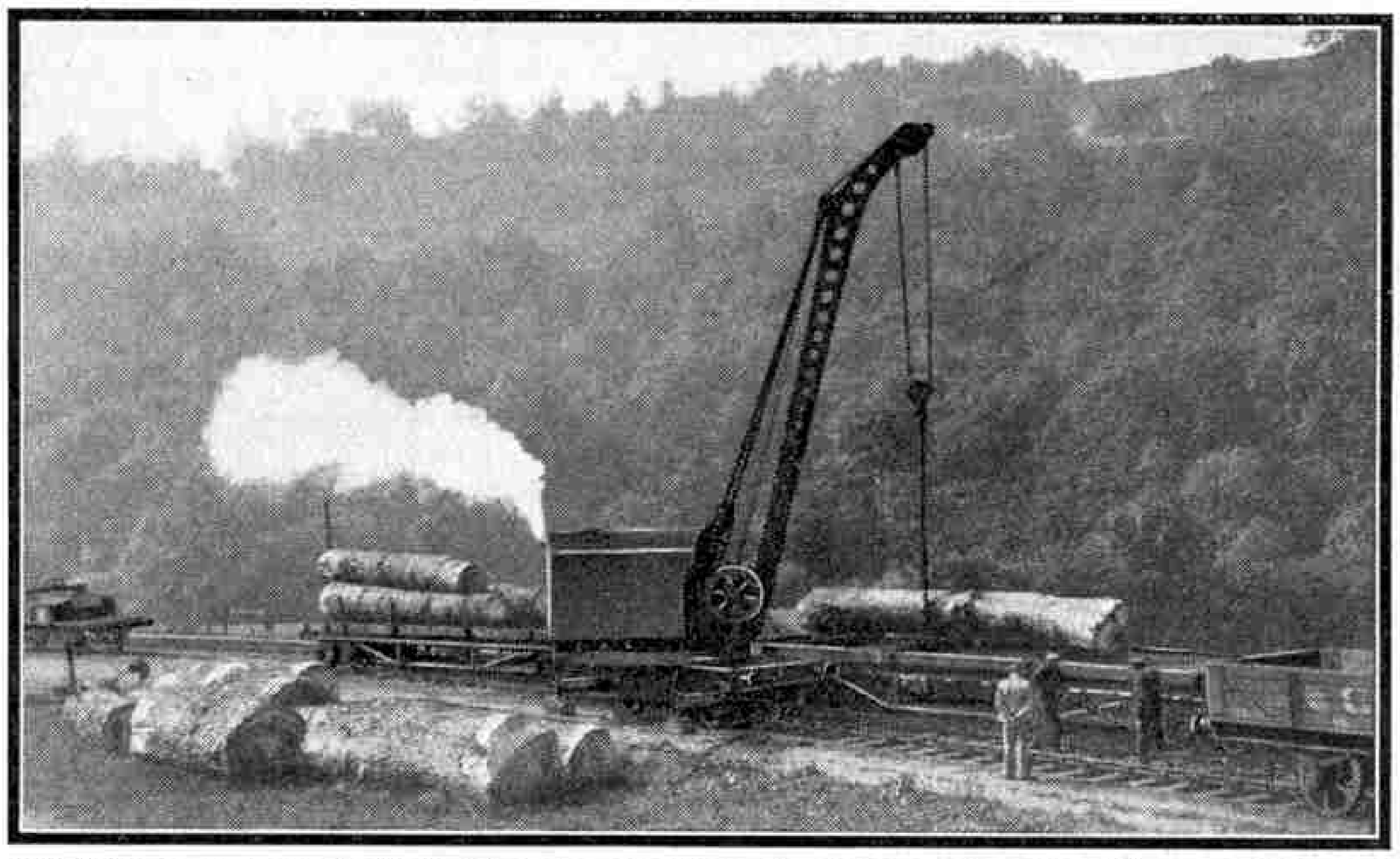
We thank Stanley Gibbons Ltd. for their courtesy in loaning the stamps from which the illustrations for our stamp pages have been made.

Line Drawings from Photographs

Suggestions for an Interesting Hobby

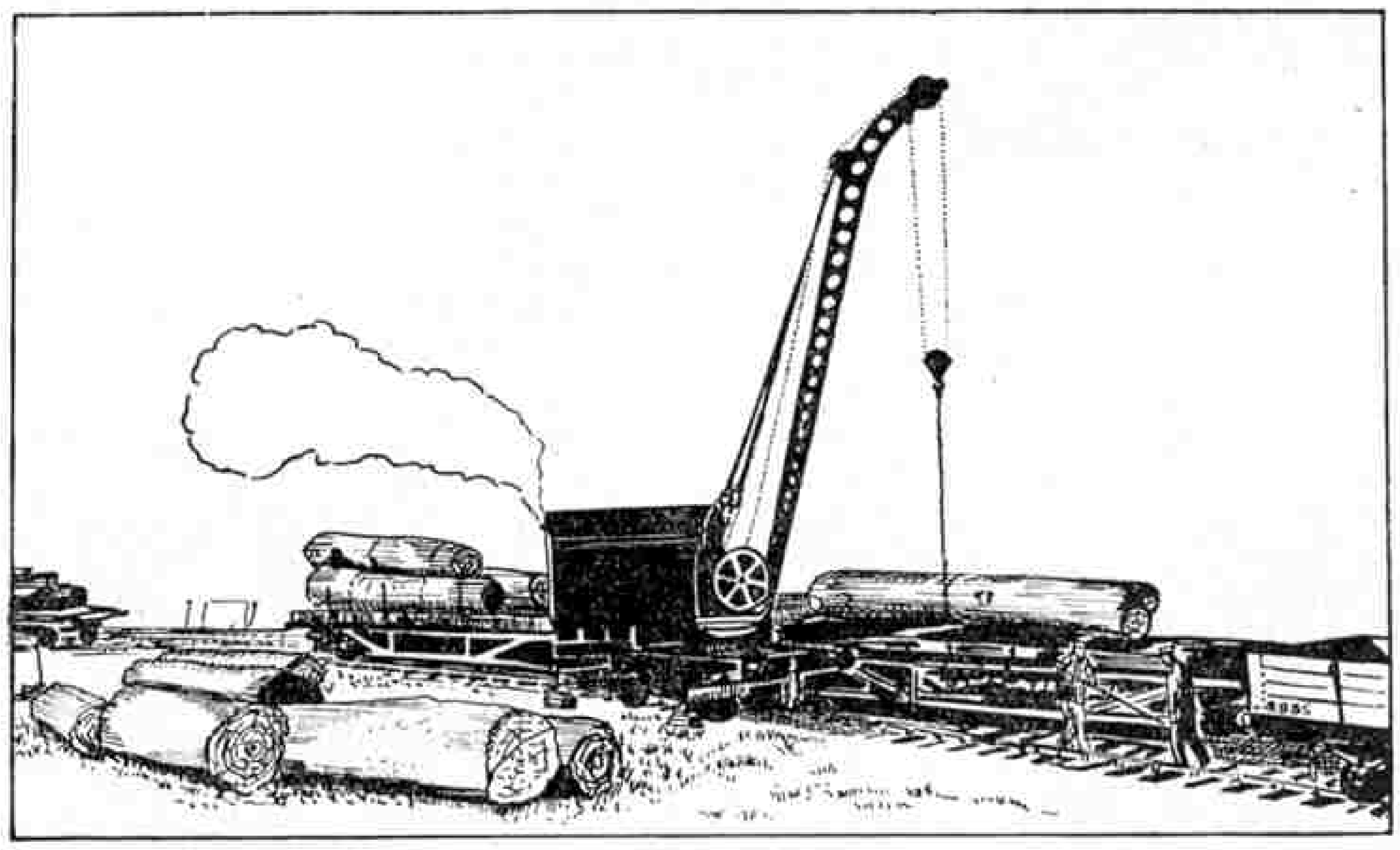
By F. W. Farley

MANY who have turned the pages of a catalogue, or looked through an illustrated magazine, have admired the drawings that help to make it interesting. These drawings, more especially in catalogues, often are made from photographs. There are two good reasons for this practice. In the first place it is possible in a drawing to emphasise the more attractive details of a product; and secondly the blocks for reproducing line drawings are not so expensive to make as the half-tone blocks that are used to reproduce photographs.



A railway scene in which detail is lost to a great extent and interest is scattered because of the dark background to the crane and the logs that are being loaded.

As long as a fairly simple subject is chosen at first, there is no reason why any reader should not turn out some very pleasing line drawings, by making use of the following process. The drawing is made with waterproof Indian ink or pencil on the surface of a gaslight or bromide print, and the photographic image is afterwards completely bleached out. The illustrations on this page show a photograph, and a drawing made from it in which the background has been entirely removed by this interesting method.



A line drawing made from the photograph reproduced above. The background has been removed, and interest is now centred on the loading operations.

Pale underexposed prints are most easily bleached, so that readers who do their own gaslight printing, or even enlarging, need not throw away the offending prints when they happen to underestimate exposure. Such prints fixed, washed and dried in the ordinary manner provide excellent material upon which to experiment, and with them the bleaching can be done with any photographic reducer.

For ordinary prints a different method of bleaching is necessary, and this can be used for the darkest photographs. The drawing is done on the dry print, which is then soaked in a liquid made by adding water to tincture of iodine, which is a solution of iodine in potassium iodide. The strength of this solution is not important, but if the print is a dark one more tincture of iodine may have to be added to complete the action. In this solution, the photograph turns yellow after a short time. It is then rinsed in clean water, and transferred to a dish containing a solution of plain hypo. Hypo crystals are obtainable at the chemists at about 4½d. per lb., and a solution containing two ounces, or roughly two tablespoonfuls, to a pint of water will be strong enough. All traces of the photograph disappear almost as soon as the print enters the hypo, leaving the drawing on white paper.

During the bleaching, a chemical action takes place between the iodine in the solution and the silver grains in the photograph, with the formation of a compound called silver iodide. This silver salt is insoluble in water, but is readily dissolved by ordinary hypo, just as unchanged silver bromide in the emulsion of an exposed plate or film is dissolved out in the fixing process that follows development. The bleached print is allowed to remain in the dish of hypo for a few minutes in order to make sure that all the silver iodide is removed, for this is sensitive to light and would be darkened by a strong light, and the print is then thoroughly washed in clean water and finally pinned up to dry.

A great variety of interesting results can be produced by using this iodine bleach. One can make caricatures by drawing over portraits, or by painting over the faces with waterproof varnish and adding tiny bodies of Indian ink. The bleaching takes out the real bodies and leaves the faces untouched. Another way is to study the features carefully for a moment, and then draw over them, deliberately exaggerating such things as prominent ears, a wide mouth, and so on. Discretion should be used in this, however, for the result is likely to be extremely unflattering!

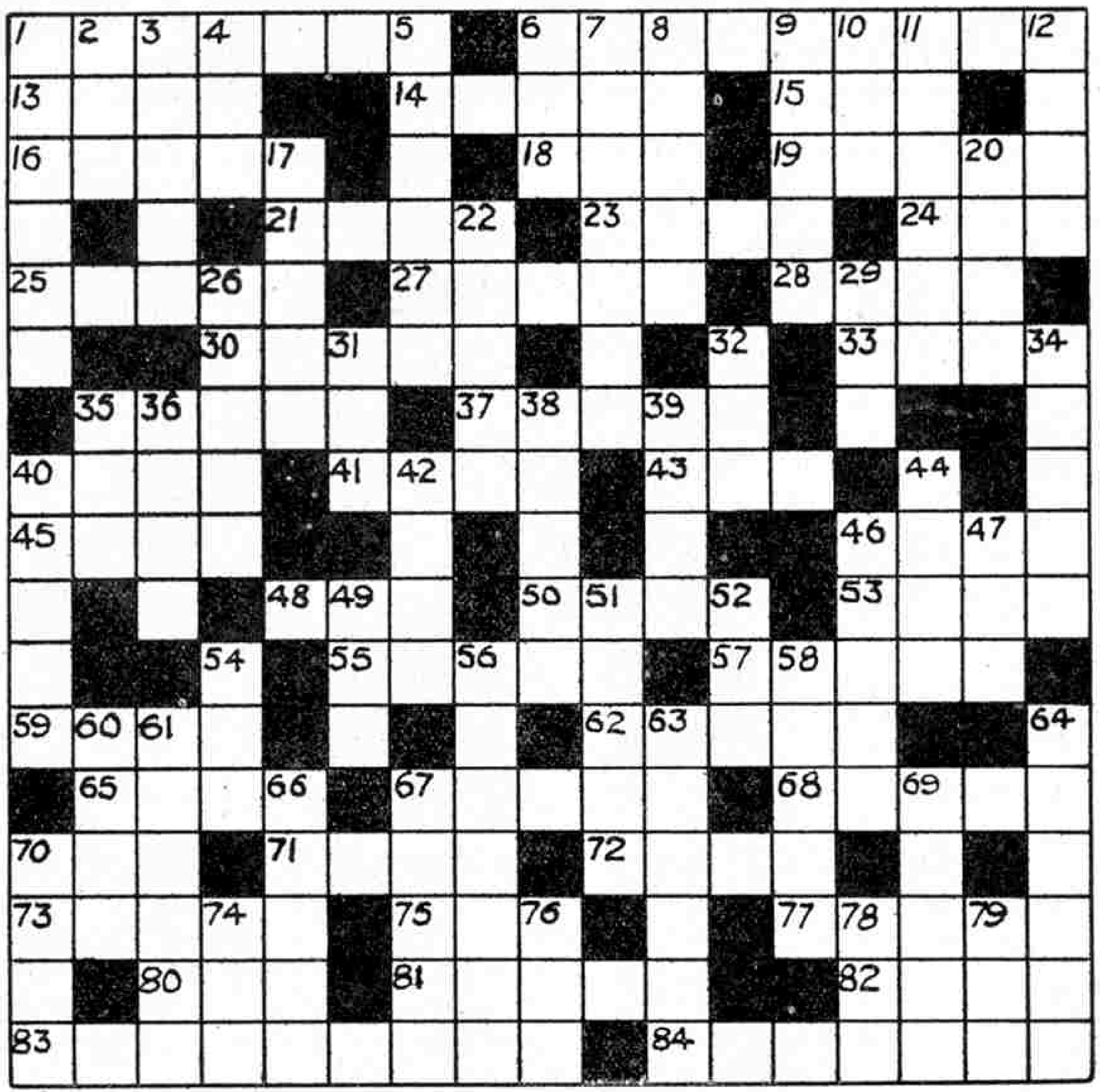
Those who would like to improve their skill in drawing will find it very helpful if they shade a portrait head with a soft pencil, trying as far as possible to obtain the same effects of light and shade and noting where lines of shadows are necessary to build up the features.

Competition Corner

OCTOBER CROSSWORD PUZZLE

CLUES ACROSS

1. Long narrow flag
6. Magnificent
13. Plane surface
14. Void
15. Sphere
16. Grates
18. Hole
19. Small bay
21. Partly open
23. Handle
24. Possess
25. Fertile spot
27. Benefactor
28. Trigonometrical ratio
30. Underground worker
33. Man-eating monster
35. Make smooth
37. Mohammedanism
40. Boast
41. Veer
43. Watch secretly
45. Circuit
46. Thin strip of wood
48. Possesses
50. Trial
53. Narrow woven band
55. Untidy
57. Worshipping figure
59. Citrous fruit
62. Aquatic mammal
65. Legendary Icelandic tale
67. Group of people
68. Backless seat
70. Fastener
71. Series of rings
72. Stain
73. In motion
75. Beverage
77. Precipitous
80. Before
81. Simpleton
82. Eagle
83. Means of vision
84. Thin lines



CLUES DOWN

1. Forgive
2. Epoch
3. Comfortable
4. Woolly surface on cloth
5. Long reproving speech
6. Undermine
7. Single leaf
8. Measuring apparatus
9. Snare
10. Vase for storing ashes of the dead
11. Greater in length than breadth
12. Satisfy the appetite
17. Indian antelope
20. Large jug
22. Dewy
26. Counterpart
29. Term in electrolysis
31. Meshed fabric
32. Little fiend
34. Make proud
35. Make furtive inquiries
36. Small song bird
38. Satirical remarks
39. Demands
40. Native stimulant
42. Semicircular recess in a church
44. Tribe
46. Wince
47. Ready
49. Abb. of an electrical term
51. Islands
52. Small drinking-cup
54. Cask
56. Curved edge
58. Remains
60. Egyptian goddess
61. Ornamental shelf
63. Office worker
64. Inclines
66. Stretches of land
67. Musical instrument
69. Musical drama
70. Breathe heavily
74. Anger
76. Lengthen
78. Starting point in golf
79. Termination

This month we give another of the popular *"M.M."* crossword puzzles, which are intended for amusement rather than strenuous competitive effort. This month's puzzle will be found to follow the lines of those set in previous issues. It is fair and interesting, and the clues are all perfectly straightforward. Every word used can be found in Chambers' or any other standard dictionary.

Prizes of Meccano products to the value of 21/–, 15/–, 10/6 and 5/– respectively will be awarded in order of merit to the senders of the four correct solutions that are neatest or most novel in presentation. Prizes of the same value will be awarded in the Overseas section, which is open to all readers living outside Great Britain, Ireland and the Channel Islands.

Entries should be addressed *"October Crossword Puzzle,* Meccano Magazine, Binns Road, Liverpool 13," and must be sent to reach this office not later than 31st October. Overseas readers' entries must arrive not later than 31st January 1939.

Winter Photo Contests

This year there has been a remarkable increase in the number of entries in our Photo Contests, and we have decided to give further opportunities for readers to give expression to their growing enthusiasm for photography by continuing our photographic competitions throughout the winter. The conditions of the new series of contests will generally be similar to those held during the summer.

In this month's contest any outdoor photographs of autumn interest will be eligible, but indoor subjects will be restricted to trick photographs of the type described in the article on page 550 of this issue. There are no restrictions as to size of prints, make of camera, plate, film or paper, and the developing and printing may have been professionally done. The exposure must be by the competitor himself, however.

Entries will be divided into the usual two sections, A, for readers aged 16 and over, and B, for those under 16. Prizes value 21/– and 10/6 will be awarded in each section.

Entries to this month's contest should be addressed *"October Photo Contest,* Meccano Magazine, Binns Road, Liverpool 13." They must arrive not later than 31st October. Overseas closing date, 31st January 1939.

Competition Closing Dates

HOME	
October Crossword Puzzle	... 31st October
October Photo Contest ...	... 31st October
OVERSEAS	
"Hidden Proverbs" Contest	... 31st October
July Photo Contest ...	... 31st October
August "Silhouettes" Contest	... 30th November
August Photo Contest ...	... 30th November
September Crossword Puzzle	... 31st December
September Photo Contest	... 31st December
October Crossword Puzzle	... 31st January
October Photo Contest ...	... 31st January

COMPETITION RESULTS

OVERSEAS

Test XI Voting Contest.—1. R. KIBBLEWHITE (Featherston, N.Z.). 2. J. A. GNANADURAI (Trichinopoly, S. India). 3. T. WATSON (West Leichhardt, N.S.W.). 4. D. RAMA KRUHA (Madras).

May Photo Contest.—Readers will be interested to learn that the quality of the entries to this competition was the highest in the history of the Overseas Photo Contests. The Editor was so favourably impressed that he has awarded two special prizes of 10/6 each in the A Section, and in addition a series of consolation prizes.

The full list of awards is as follows: First Prizes: Section A, P. GILLES (Montpellier, France); Section B, J. JASPER (Manly, Australia). Second Prizes: Section A, E. A. GRUBB (Vancouver, B.C.); Section B, K. R. CASSELLS (Wellington, N.Z.). Special Prizes: Section A, F. SCHORREWEGEY (Lierre, Belgium); J. M. DEMANUELE (Valletta, Malta). Consolation Prizes: J. A. ANDERSON (Ashburton, N.Z.); G. C. TAYLOR (Willoughby, N.S.W.); T. WATSON (West Leichhardt, N.S.W.).

HOME

"August Silhouettes Contest."—1. F. W. TERRY (Grimsby). 2. H. J. BUCKINGHAM (Bletchley). 3. I. HARRIS (London W.6). 4. E. NOBLES (Duston).

"August Photo Contest."—First Prizes: Section A, J. R. TOTTLE (Taunton); Section B, J. W. COLE (Kingston-on-Thames). Second Prizes: Section A, MISS PENNETHORNE (Haywards Heath); Section B, J. BRIGHTON (Diss).

FIRESIDE FUN

TRY THIS

Say this three times quickly: If a coal cart could cart coal, how much coal could a coal cart cart if a coal cart could cart coal?

* * * *

"I hear the '*Normandie*' goes so fast that they often have to stop to cool the propellers."

"That's nothing. The '*Queen Mary*' goes so fast that she has to stop to pick up the wireless messages."

* * * *

Doctor (to patient): "It's nothing to worry about. Just a little boil on the back of your neck. But you must keep your eye on it."

* * * *

Lady (who has just been saved from drowning): "My preserver! My preserver!"

The Rescuer: "All right, mum. Yer needn't rub it in just because a bloke works in a jam factory."

* * * *

"Mother, have I been a good boy lately?"

"Yes, Bobbie; you have been very good indeed."

"And do you trust me, mummy?"

"Why, of course, I do trust you, dear?"

"Then why do you go on hiding the jam?"

* * * *

Teacher: "An abstract noun is something you can think of but not touch. Now give an example."

Bob: "Please sir, a red-hot poker!"

* * * *

Two men were discussing the relative merits of being killed by a collision or an explosion.

"A collision is better," said one. "You know where you are; but with an explosion where are you?"

* * * *

Officer (to Raw Recruit): "Don't you know better than to point an empty gun at me?"

Recruit: "But it's not empty, sir, it's loaded!"

* * * *

Caller: "I would like to see the judge, please."

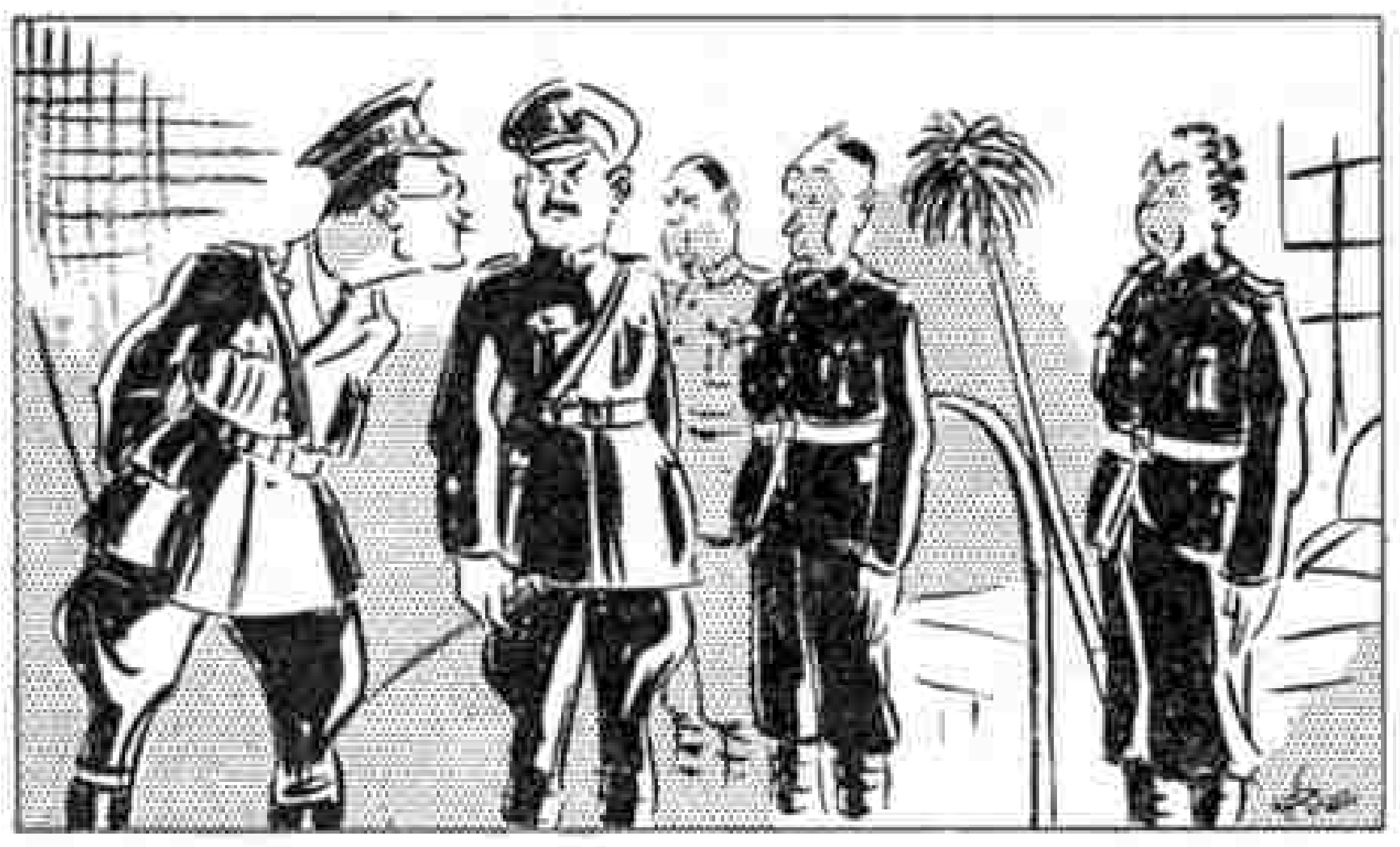
Secretary: "I'm sorry, sir, but he is at dinner."

Caller: "My errand is important."

Secretary: "It can't be helped, sir, His Honour is at steak."

* * * *

MISTAKEN IDENTITY



A very short-sighted officer was inspecting kit in the barrack-room. Some one had left a mop leaning against the foot of a bed.

"Sergeant," roared the officer.

"Yes, sir?"

"See that that man has his hair cut, at once."

* * * *

Chemist (to his stout wife): "Don't come into the shop for a minute, Sarah. I am trying to sell six bottles of my fat-reducing mixture."

* * * *

A stranger addressed a young farmer across the fence.

"Young man, your corn looks kind of yellow."

"Yes, that's the kind we planted."

"Don't look as if you'll get more than half the crop."

"Don't expect to. The landlord gets the other half."

(After a pause.) "Boy, there isn't much between you and a fool."

"No, only the fence."

Stranger retires.

* * * *

Policeman: "The bus driver made a statement."

Counsel: "What was it?"

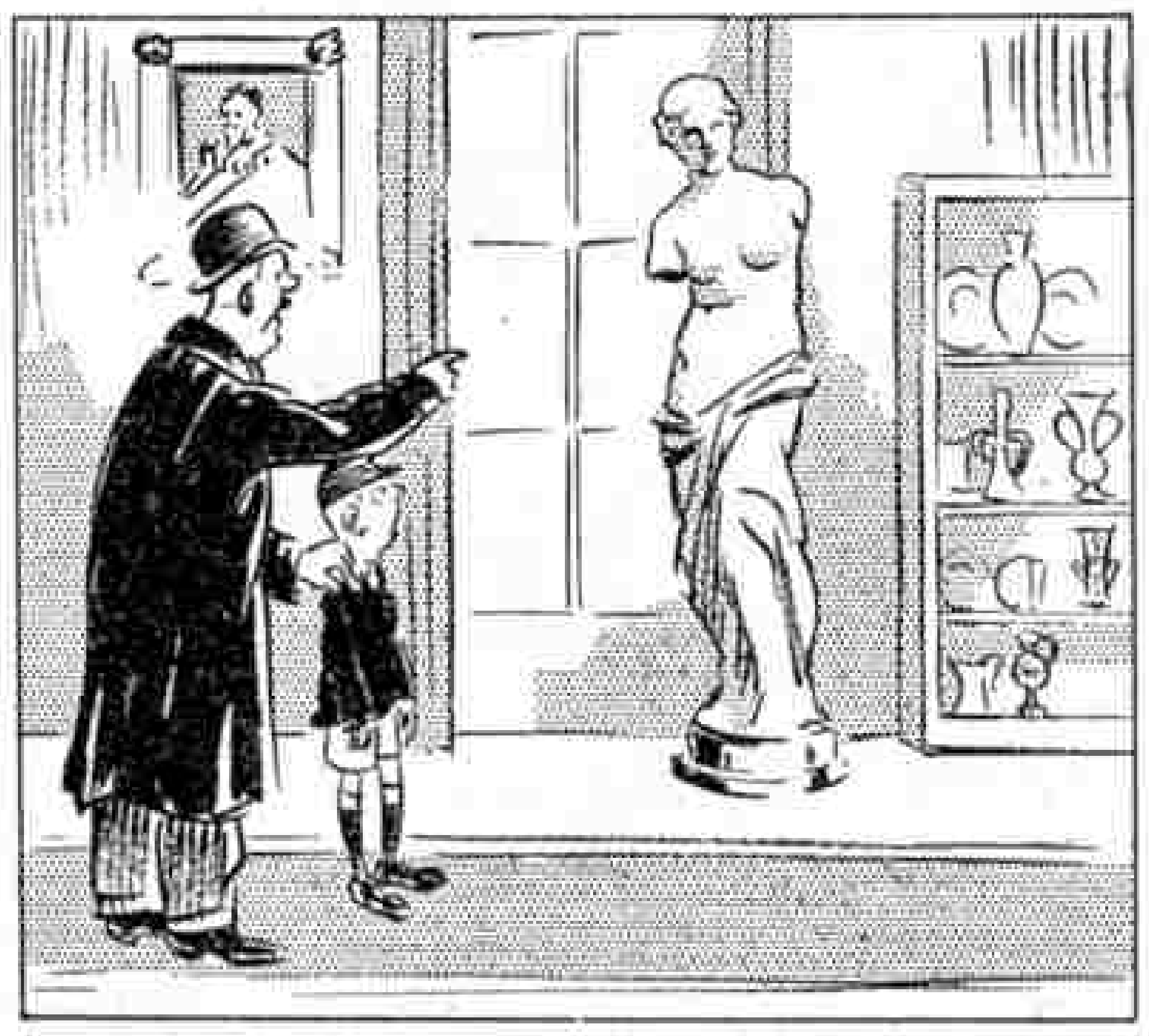
Policeman: "He said, 'I do not wish to make any statement'."

HOUGH TOUGH!

The wind was rough
And cold and blough,
She kept her hands within her mough.
It chilled her through,
Her nose grew blough,
And still the squall the faster flough.
And yet, although
There was no snough,
The weather was a cruel fough.
It made her cough—
Pray, do not scough—
She coughed until her hat blough ough.

* * * *

YOU HAVE BEEN WARNED!



Daddy (showing his offspring the armless Venus de Milo): "See what happens if you keep on biting your nails!"

* * * *

Pamela: "Isn't Spot a naughty dog, Mummy? He ate my doll's slipper."

Mother: "Yes, darling. He ought to be punished."

Pamela: "I did punish him. I went straight to the kennel and drank his milk."

* * * *

"How is it Jones isn't at work this morning?" asked the foreman.

"He met with an accident at his wedding yesterday," explained the workman. "When he came out of the church, he had to walk under an arch of crossed picks. Just then a whistle went, and his mates downed tools."

* * * *

Suspicious Grocer: "Hi! are you trying to steal an apple?"

Willie: "No, I'm trying not to!"

* * * *

"What's your profession?"

"Timber merchant."

"Oh!"

"I sell matches at a street corner."

* * * *

Circus Proprietor (to lion tamer): "What do you mean by going off to dinner and leaving the cage unfastened? Anybody might have nipped in and taken the lion!"

* * * *

Haughty Stranger (to navvy): "Which is the quickest way to the hospital, my man?"

Navvy: "Poke me in the back with that walking stick again, and you'll find yourself there in no time."

* * * *

Client: "Has this dog a good pedigree?"

Salesman: "If he could talk, he wouldn't speak to either of us."

* * * *

Teacher: "When I was your age I would have been ashamed if I couldn't have done sums twice as hard as that."

Pupil: "But perhaps you had a better teacher."

* * * *

"How do trees become petrified?"

"The wind makes them rock."

* * * *

THIS MONTH'S HOWLER

Skylark is the leading character in Shelley's "*Merchant o Venice.*"

A SLIGHT MISAPPREHENSION!

A local train was pulling out from the platform when a young man, almost exhausted, just managed to tumble into a compartment and seat himself, panting and puffing, opposite an old gentleman.

The latter looked on with disapproval, and said: "You must be unfit, young man. When I was your age I never panted like that after a short run."

"Perhaps not," retorted the youth, regaining his breath, "but I missed the train at the last station."

* * * *

"How does Bill get all those bruises on the back of his hands?"

"He plays the concertina and lives in one of the new Council houses."

* * * *

"What did King Charles II do when he first came to the throne?"

"Sat on it, of course!"

* * * *

Postal Clerk: "You have put a penny too much in stamps on this parcel, madam."

Old Lady: "Oh, dear, I do hope it won't be sent too far!"

* * * *

Boxer: "Win, lose, or draw I get five thousand pounds."

Reporter: "I see—every clout has a silver lining."

* * * *

A keen seed-dealer was trying to sell a packet of seeds to an old lady.

"How long will they take to grow?" she asked.

"All you have to do when you get home is this: Throw the seeds around, cover them with earth, and jump back quickly."

* * * *

Master: "Smith, why are you always standing up and looking over Jones's shoulder?"

Smith: "Because he doesn't write plainly, sir."

* * * *

Tommy (to guest): "Do you like that cake, Mrs. Brown?"

Mrs. Brown: "Yes, dear, very much."

Tommy: "That's funny, 'cause mother said you haven't any taste."

* * * *

"I wish you wouldn't whistle at your work, Bert."

"I wasn't working, Alf.; just whistling."

* * * *

Dad: "If you ask me another question I'll pack you off to bed."

Son: "Why?"

* * * *

Boy: "I want to buy some paper."

Dealer: "What kind of paper."

Boy: "Fly-paper. I want to make a kite."

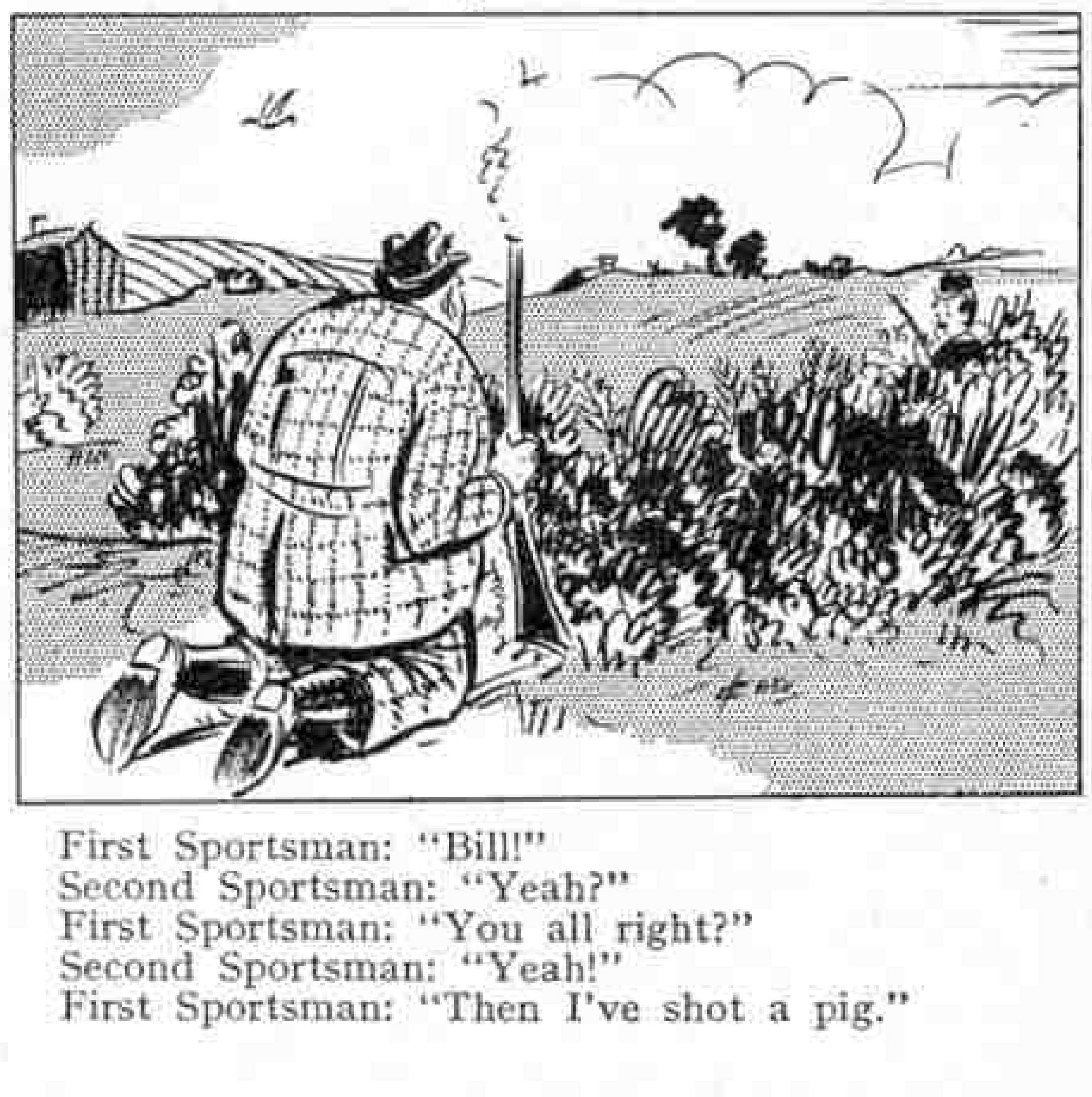
* * * *

Brown: "I don't know why the audience keep encoring that rotten singer."

Jones: "Oh, they want to keep him on the stage until the boy with the eggs comes back."

* * * *

A SQUEALER



First Sportsman: "Bill!"

Second Sportsman: "Yeah?"

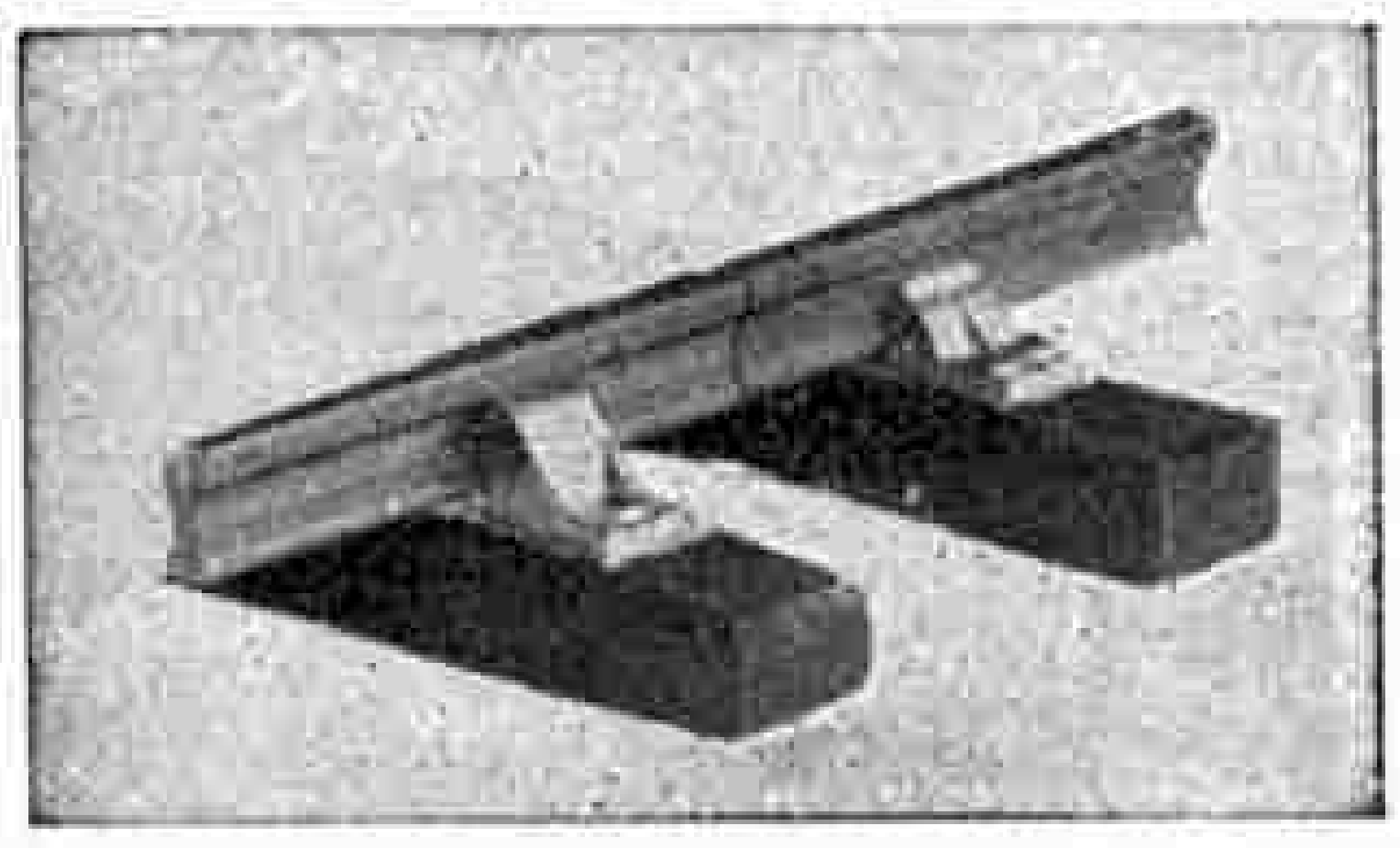
First Sportsman: "You all right?"

Second Sportsman: "Yeah!"

First Sportsman: "Then I've shot a pig."

BOND'S O' EUSTON ROAD LTD.

357, EUSTON ROAD, N.W.1



Actual Photograph of
Bond's British Permanent Way.

THE CHEAPEST SUPER DETAIL PERMANENT WAY

IN GAUGE "O" SUITABLE FOR HORNBY MODELS

We illustrate above an ACTUAL PHOTOGRAPH of Bond's Super Detail Permanent Way; this is not an Artist's Impression, but a Photograph of the Model Rail and Chairs which Bond's supply. The Rail Sections faithfully reproduce the outline of the Full Size Rails, also the Model Chair—that of the Latest Standard Chair as standardised by the British Railway Companies.

If you want Super Detail for your Model Permanent Way, you can only get this with Bond's Super Detail Permanent Way Parts.

PRICES
STANDARD GAUGE "O" PARTS

Steel Rail, sheradised	per yd. **2d., 1/8** doz. yds.
Brass Rail	per yd. **4½d., 4/3** doz. yds.
Cast Chairs, slide-on fit	per 100 **1/2.**
Cast Chairs, for wooden keys	per 100 **1/6.**
Keys	per 100 **6d.**
Fishplates	per doz. **3d.**
Sleepers, stained correct colour...	per 100 **2/3.**
Battens, ½″ x ½″ section	per yd. **2½d., 2/3** doz. yds.
Pins, approx. 1,000	**6d.** packet.
Track Gauge, special, with elec. chair jig ...	**9d.** each.
Nail presser for chair pins	**2/6** each.

All prices plus postage

MEGOW BALSA FLYING KITS

Kits for 12" wing span Flying Models of the AERONCA, BOEING P12E, CURTISS PURSUIT, HELL DIVER, LOCKHEED VEGA, MONOCOUPE, PUSS MOTH, STINSON RELIANT, TAYLOR CUB, VULTEE VIA, WACO.

Price **10d.** Postage 3d.

Kits for 24" wing span Flying Models of the STINSON RELIANT, WACO CUSTOM, MONOCOUPE, CONSOLIDATED P/30, FAIRCHILD, HAWKER FIGHTER, CURTISS HAWK, RICHMAN & MERRILL'S VULTEE.

Price **2/-.** Postage 6d.

½″ scale	AERONCA KITS, 18″ span	**3/6,**	Postage	6d.
¾″ „	„ „ 27″ „	**12/6,**	„	9d.
½″ „	TAYLOR CUB KITS, 17½″ span	**4/6,**	„	6d.
½″ „	MONOCOUPE KITS, 16″ „	**4/6,**	„	6d.
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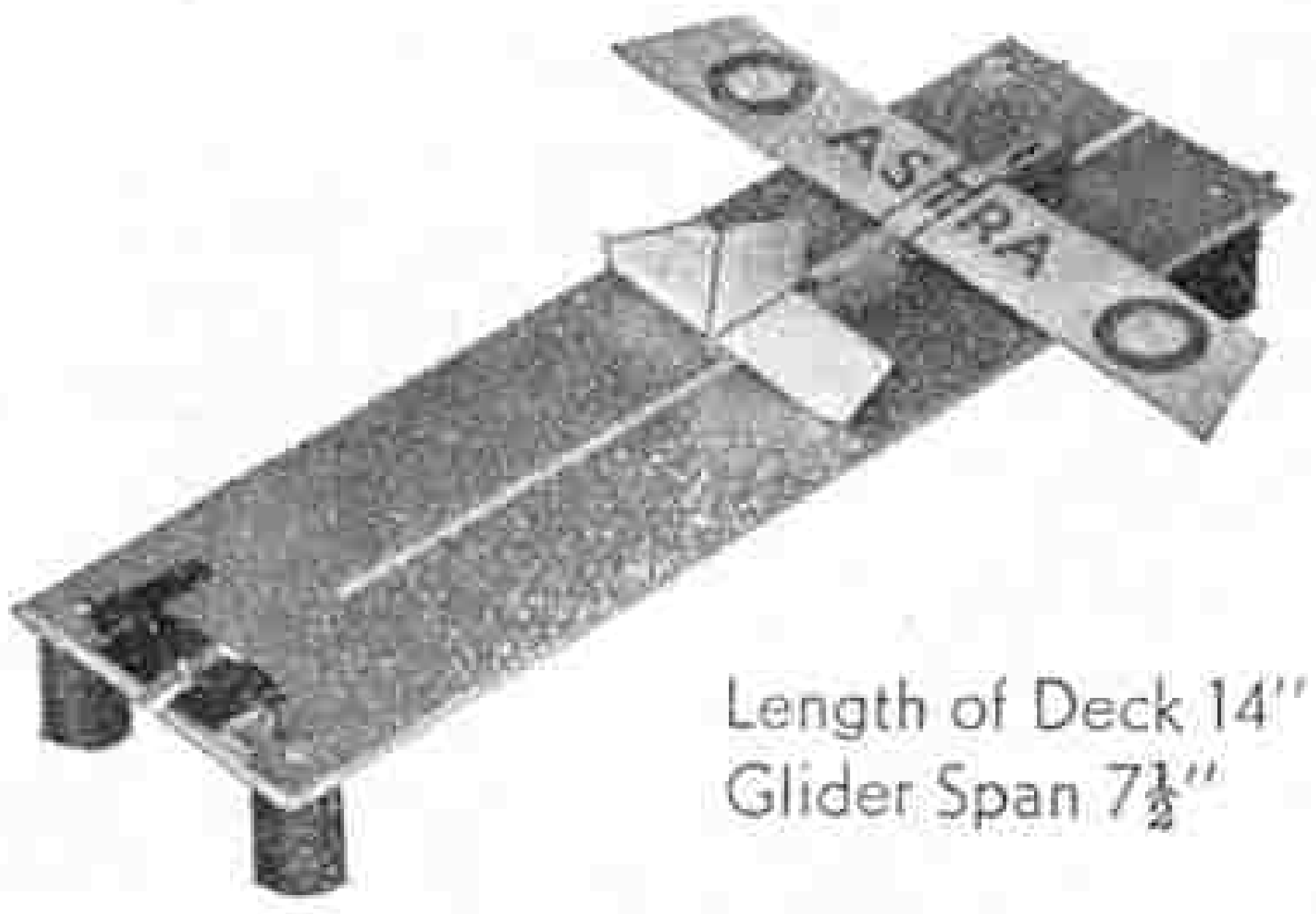

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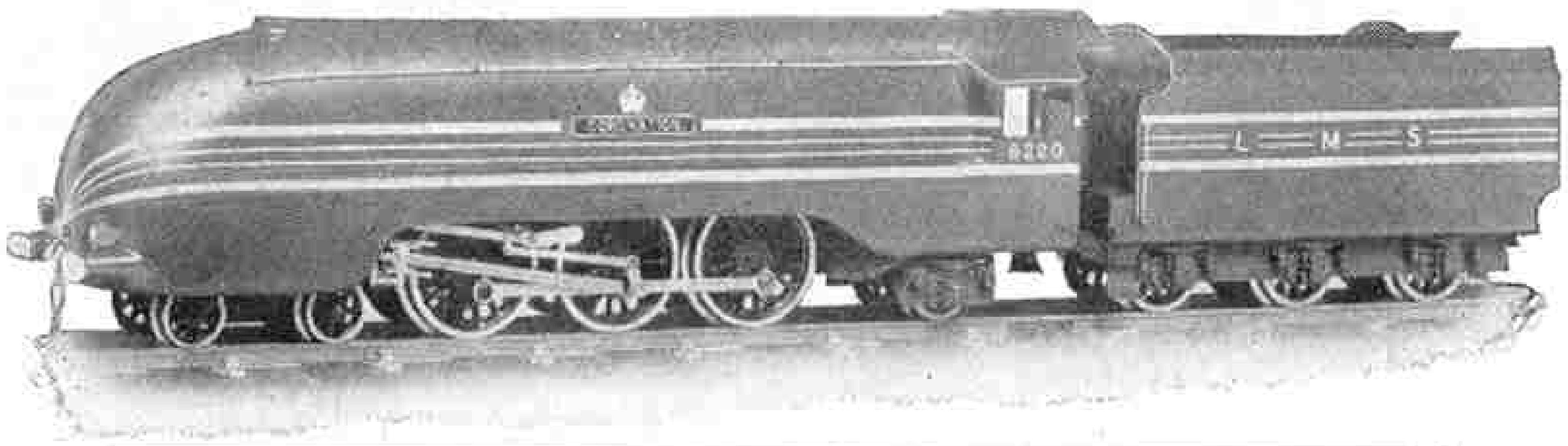

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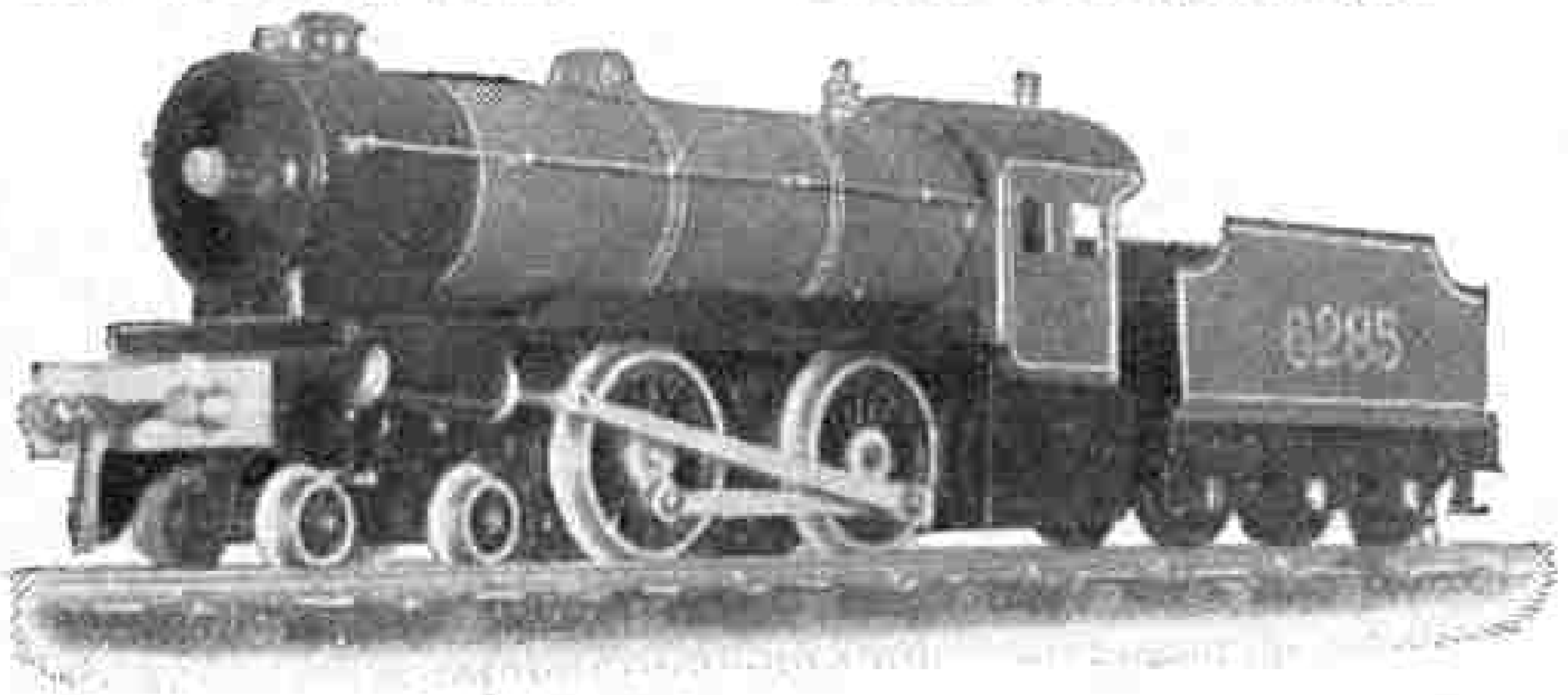

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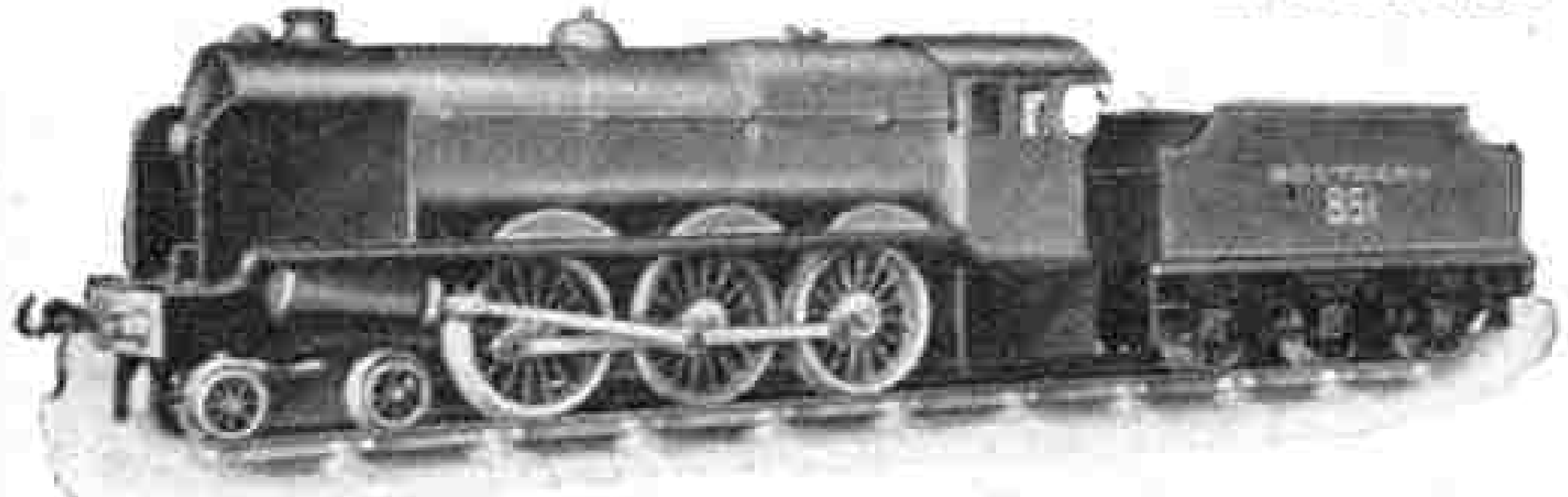

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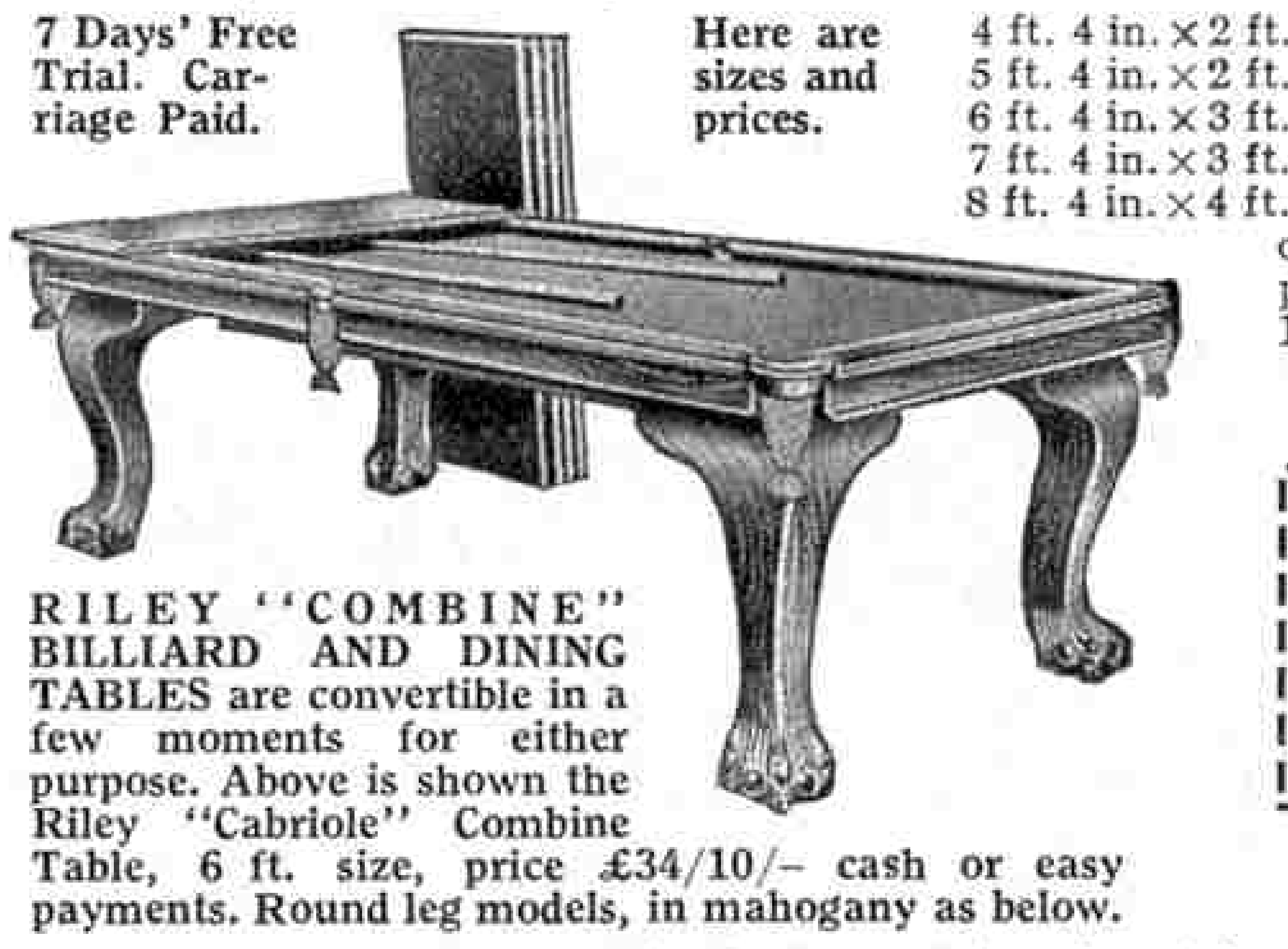

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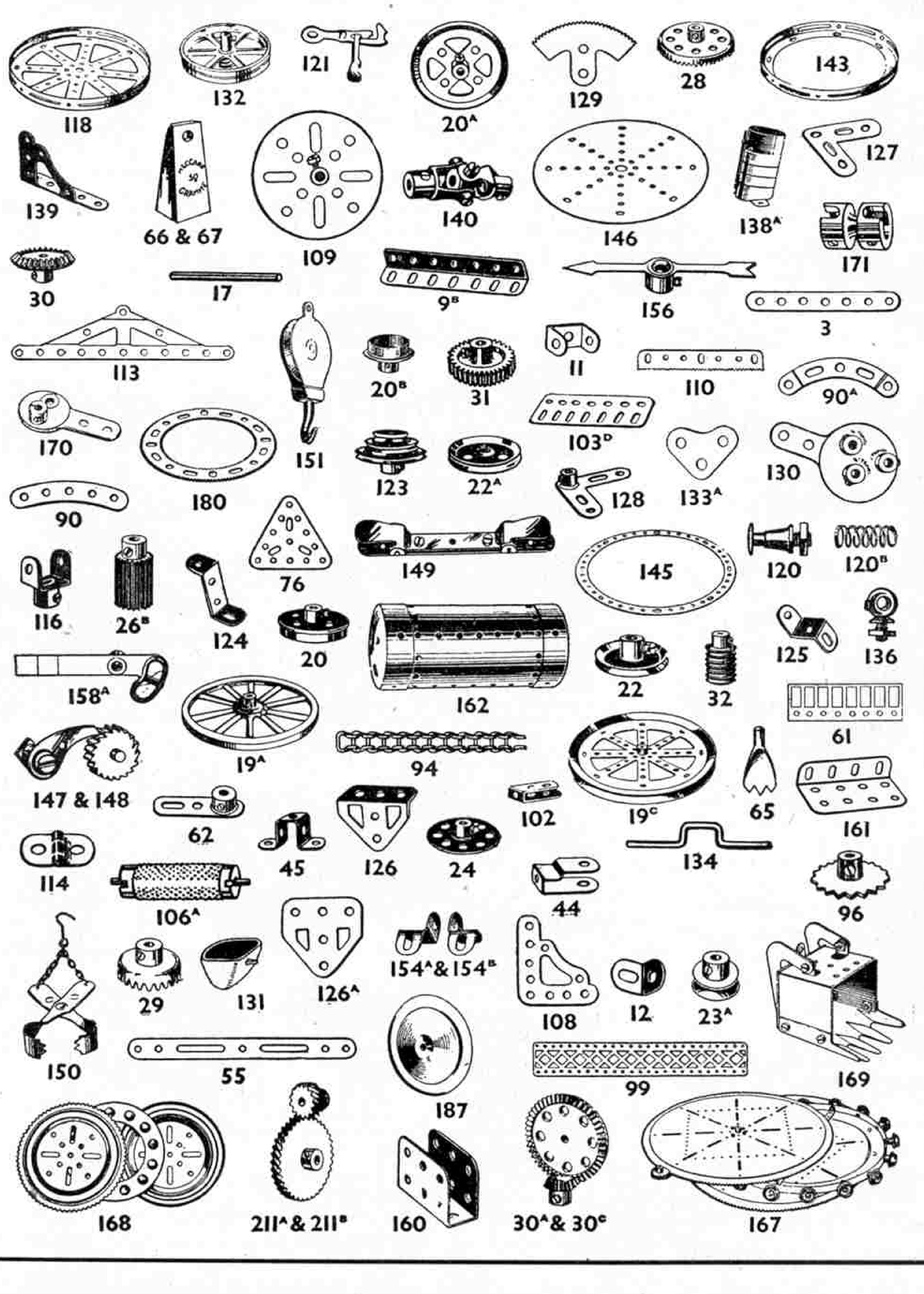

Prices of Parts Illustrated

No.			s.	d.
3	Perforated Strips, 3½″	½ doz.	0	5
9b	Angle Girders, 3½″	„	0	9
11	Double Brackets	doz.	0	3
12	Angle Brackets, ½″ × ½″	„	0	2
17	Axle Rods, 2″	4 for	0	1
19a	Wheels, 3″ diam.	each	0	6
20	Flanged Wheels, 1½″ diam.	„	0	3½
20b	„ „ ¾″ „	„	0	2½
	Pulley Wheels			
19c	6″ diam., with centre boss and set screw	„	1	9
20a	2″ diam., with centre boss and set screw	„	0	3½
22	1″ diam., with centre boss and set screw	„	0	2
23a	½″ diam., with centre boss and grub screw	„	0	2
22a	1″ diam., without centre boss and grub screw	„	0	1
24	Bush Wheels	„	0	2½
26b	Pinion Wheels, ½″ diam., ¾″ face	„	0	6
28	Contrate Wheels, 1½″ diam.	„	0	6
29	„ „ ¾″ „	„	0	4
30	Bevel Gears, ⅞″, 26 teeth	„	0	6
*30a	„ „ ½″, 16 „	„	0	4
*30c	„ „ 1½″, 48 „	„	1	6
31	Gear Wheels, 1″, 38 teeth	„	0	9
32	Worms	„	0	3½
44	Cranked Bent Strips	„	0	1
45	Double „ „	„	0	1
55	Perforated Strips, slotted, 5½″ long	doz.	1	3
61	Windmill Sails	4 for	0	9
62	Cranks	each	0	2½
65	Centre Forks	„	0	1
66	Weights, 50 grammes	„	0	9
67	„ 25 „	„	0	6
76	Triangular Plates, 2½″	„	0	2
90	2½″ Curved Strips, 2⅜″ rad.	„	0	1
90a	2½″ „ „ cranked, 1⅜″ radius	„	0	1
94	Sprocket Chain, per 40″ length		0	6
96	„ Wheels, 1″ diam.	each	0	3
99	Braced Girders, 12½″ long	½ doz.	3	0
102	Single Bent Strips	each	0	1
103d	Flat Girders, 3½″ long	½ doz.	0	9
106a	Sand Rollers	each	1	3
108	Architraves	doz.	1	9
109	Face Plates, 2½″ diam.	each	0	3½
110	Rack Strips, 3½″	„	0	2
113	Girder Frames	„	0	3
114	Hinges	„	0	3
116	Fork Pieces, Large	„	0	2½
118	Hub Discs, 5½″ diam.	„	1	0
120	Buffers	„	0	2
120b	Compression Springs	„	0	1
121	Train Couplings	„	0	1
123	Cone Pulleys	„	1	0
124	Reversed Angle Brackets, 1″	½ doz.	0	4½
125	Reversed Angle Brackets, ½″	„	0	3
126	Trunnions	each	0	1½
126a	Flat Trunnions	„	0	1
127	Simple Bell Cranks	„	0	1
128	Boss Bell Cranks	„	0	3
129	Rack Segments, 3″ diam.	„	0	5
130	Eccentrics, Triple throw	„	1	0
131	Dredger Buckets	„	0	2½
132	Flywheels, 2¾″ diam.	„	2	0
133a	Corner Brackets, 1″	„	0	1
134	Crank Shafts, 1″ stroke	„	0	1
136	Handrail Supports	„	0	3
†138a-z	Ships' Funnels, Raked	„	0	9
139	Flanged Brackets (right)	„	0	2
140	Universal Couplings	„	0	9
143	Circular Girders, 5½″ diam.	„	0	10
145	Circular Strips, 7½″ diam.	„	1	0
146	Circular Plates, 6″ diam.	„	0	7
147	Pawls	„	0	3
148	Ratchet Wheels	„	0	4
149	Collecting Shoes	„	1	3
150	Crane Grabs	„	0	6
151	Pulley Blocks, Single Sheave	„	0	7
154a	Corner Angle Brackets, ½″ (right hand)	½ doz.	0	3
154b	Corner Angle Brackets, ½″ (left hand)	„	0	3
156	Pointers, 2½″ overall	each	0	4
158a	Signal Arms, Home	„	0	5
160	Channel Bearings, 1½″ × 1″ × ½″	„	0	2
161	Girder Brackets, 2″ × 1″ × ½″	2 for	0	3
162	Boilers, Complete	each	0	11
167	Geared Roller Bearings	„	20	0
168	Ball Bearings, 4″ diam.	„	3	0
169	Digger Buckets	„	1	6
170	Eccentrics, ½″ throw	„	0	9
171	Socket Couplings	„	0	11
180	Toothed Gear Rings, 3½″ diam. 133 teeth external, 95 teeth internal	„	1	0
187	Road Wheels	„	0	4
*211a	Helical Gears, ½″	„	0	10
*211b	„ „ 1½″	„	2	3

**Can only be used together.*

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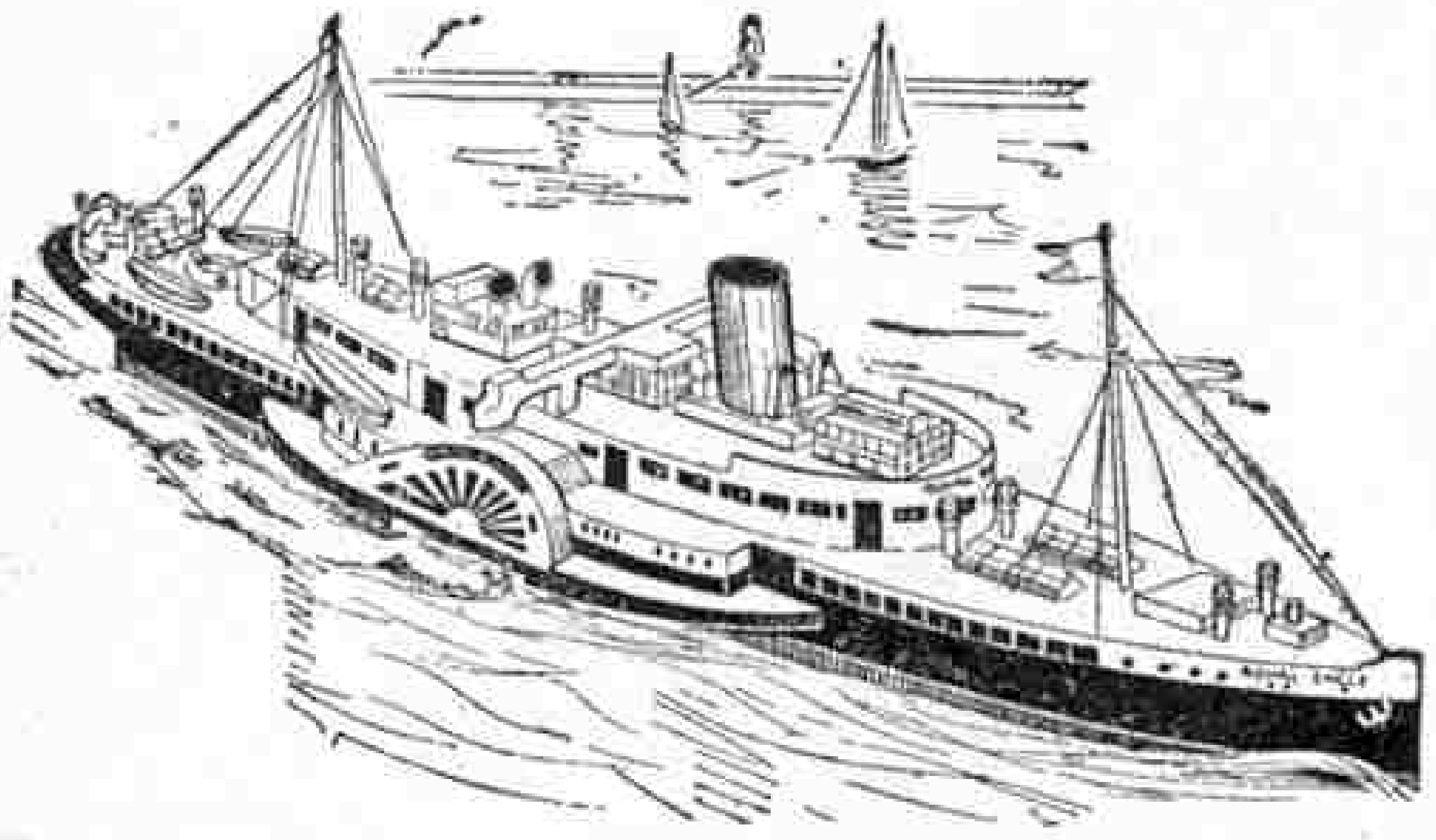

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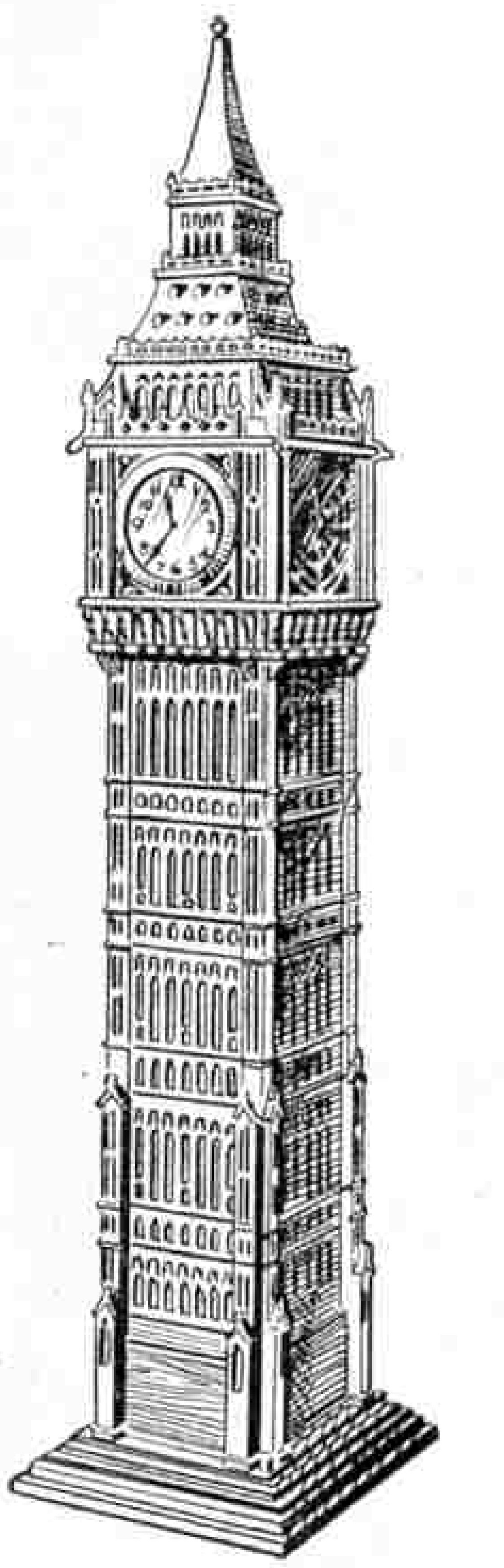

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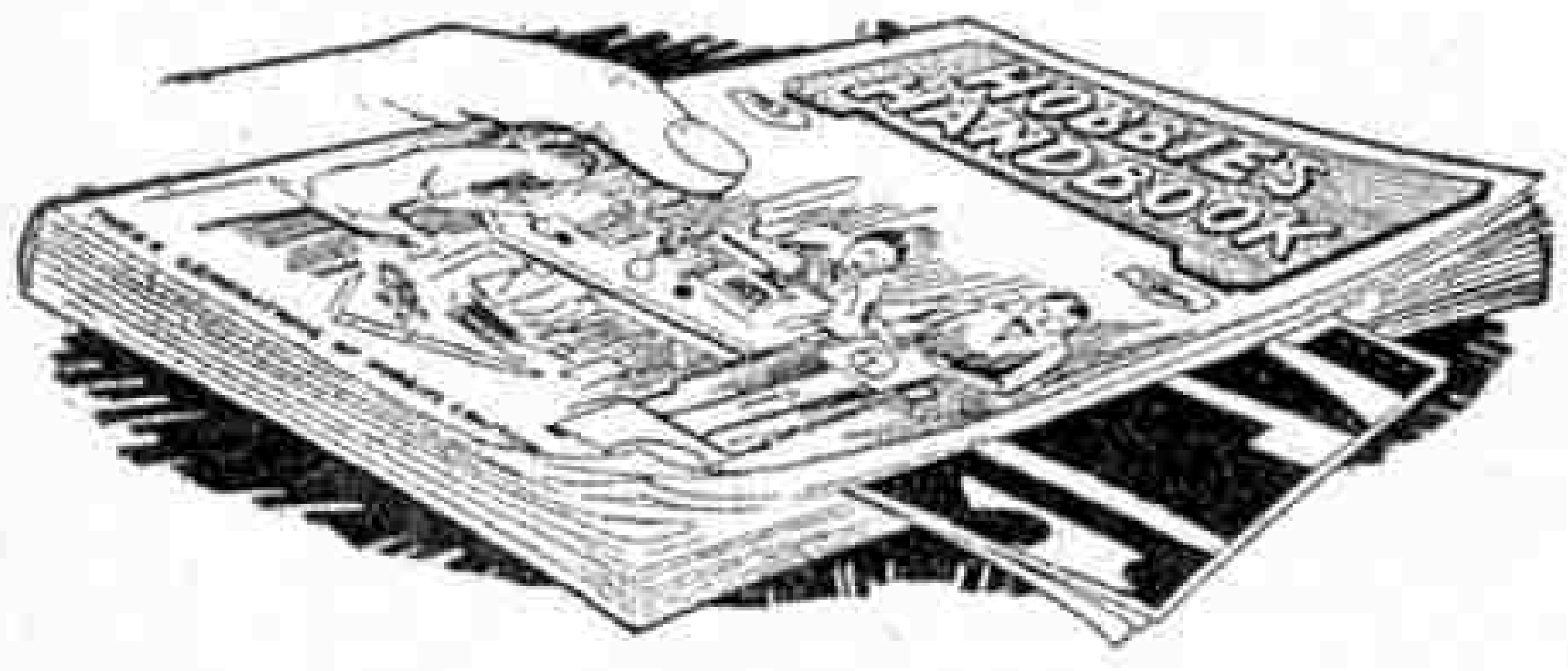

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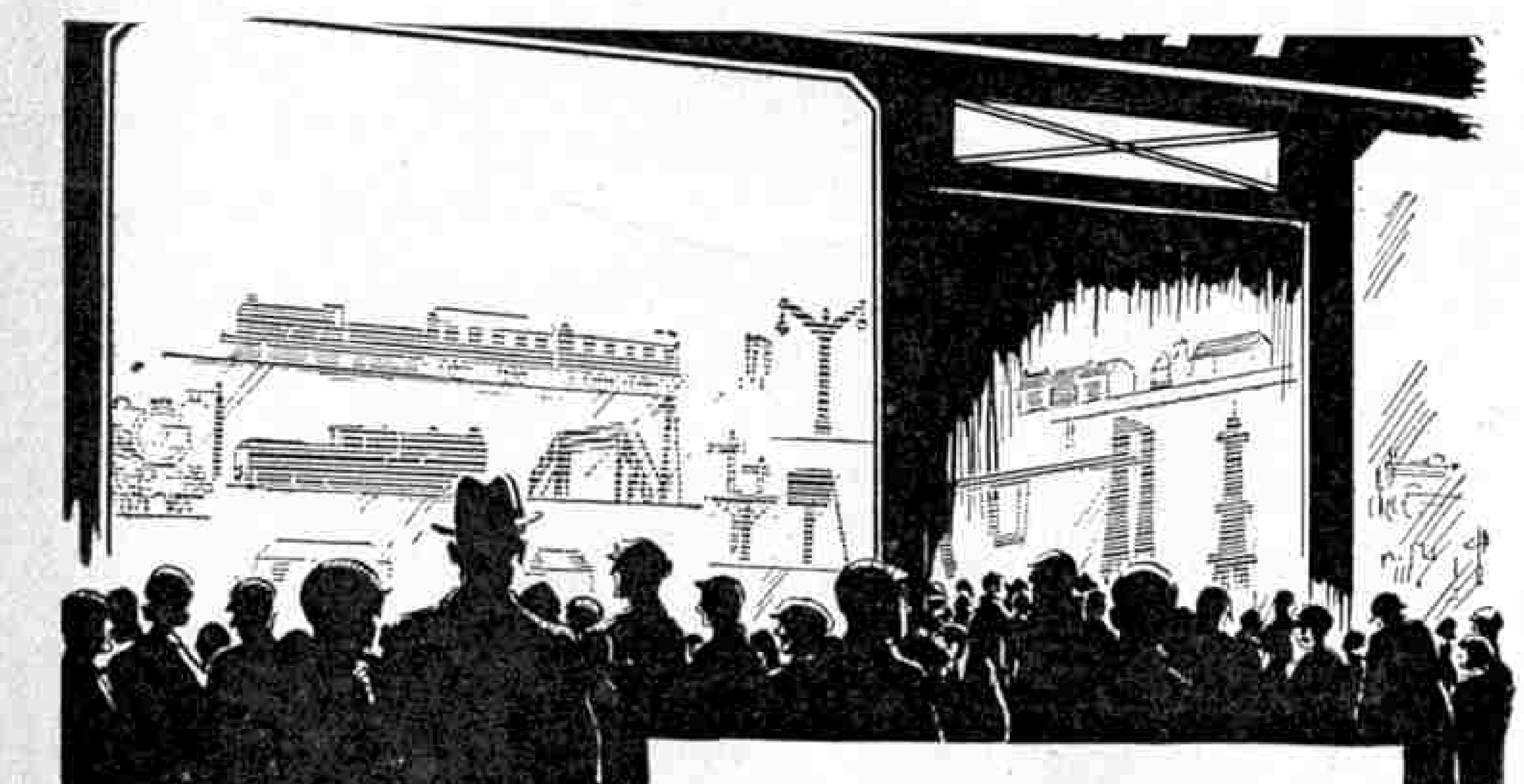

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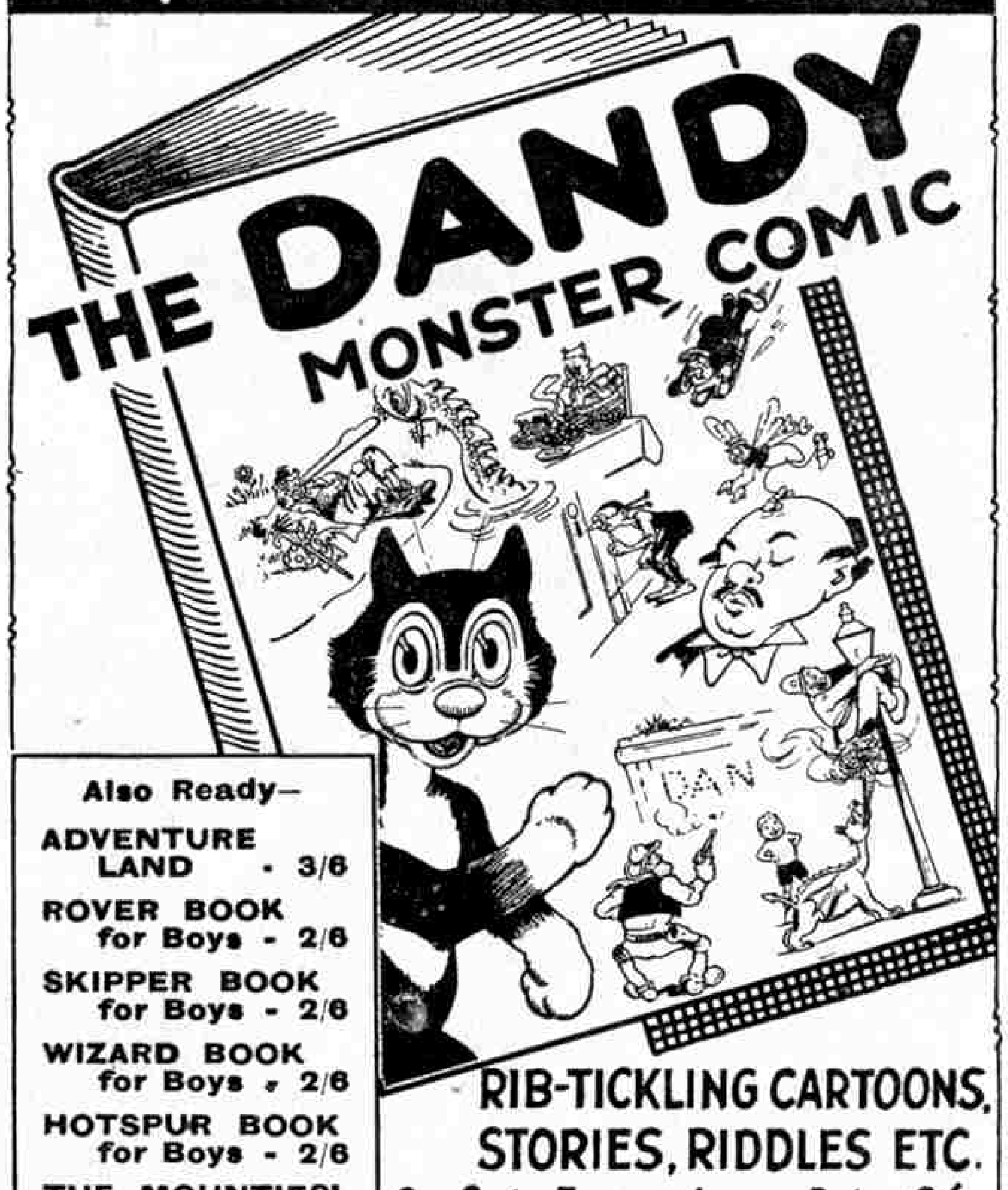

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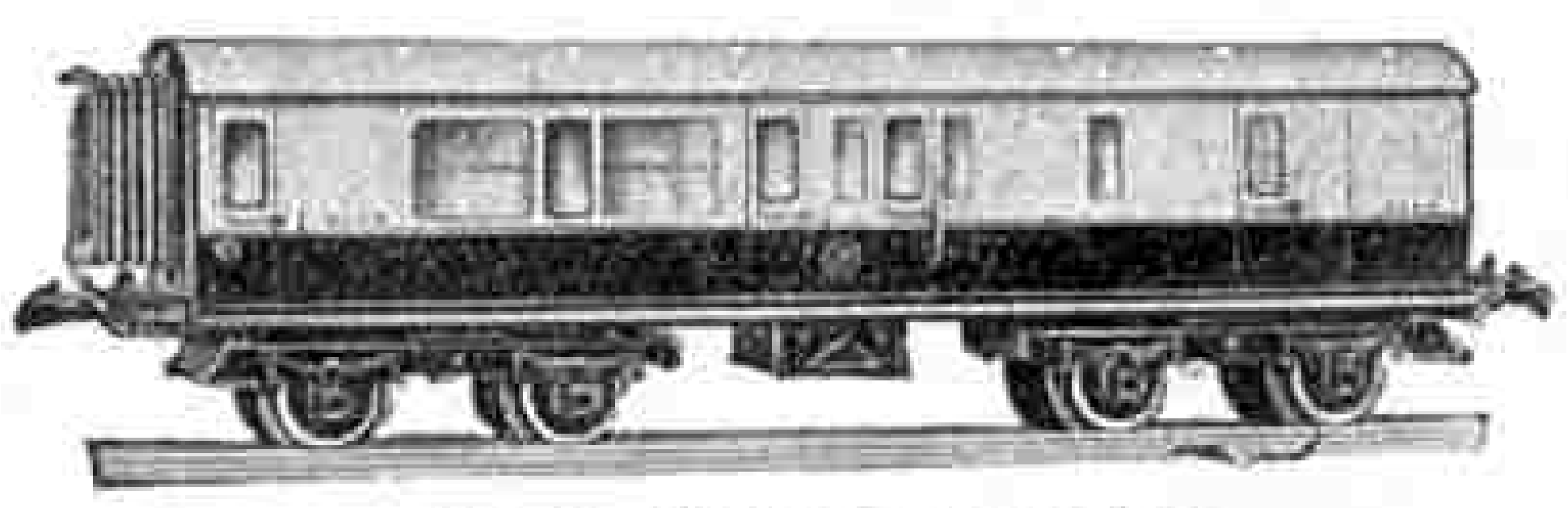

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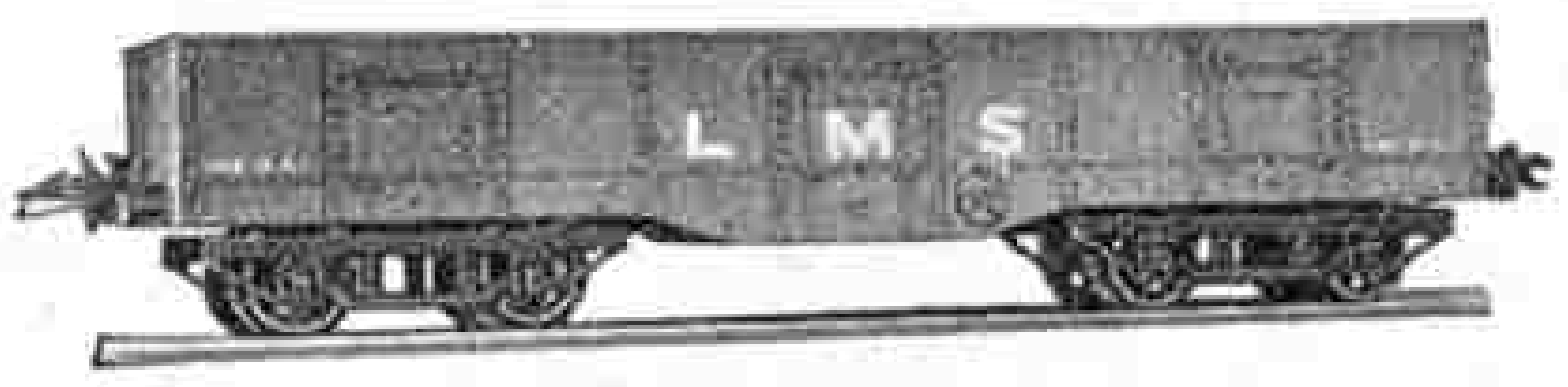

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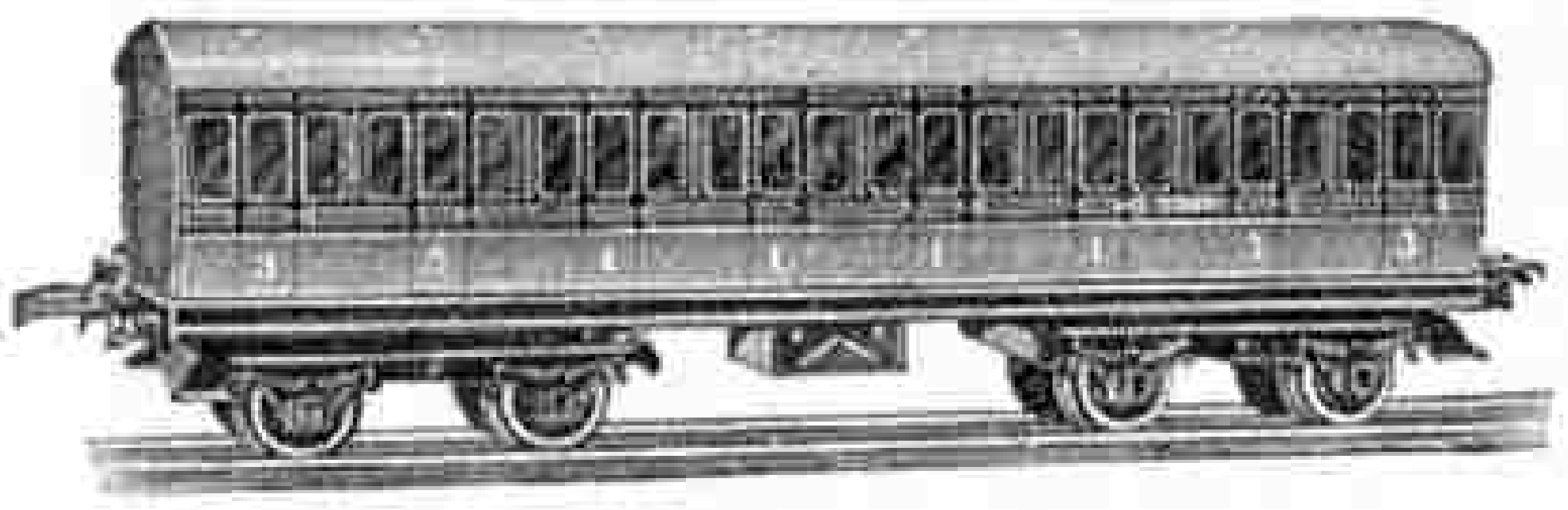

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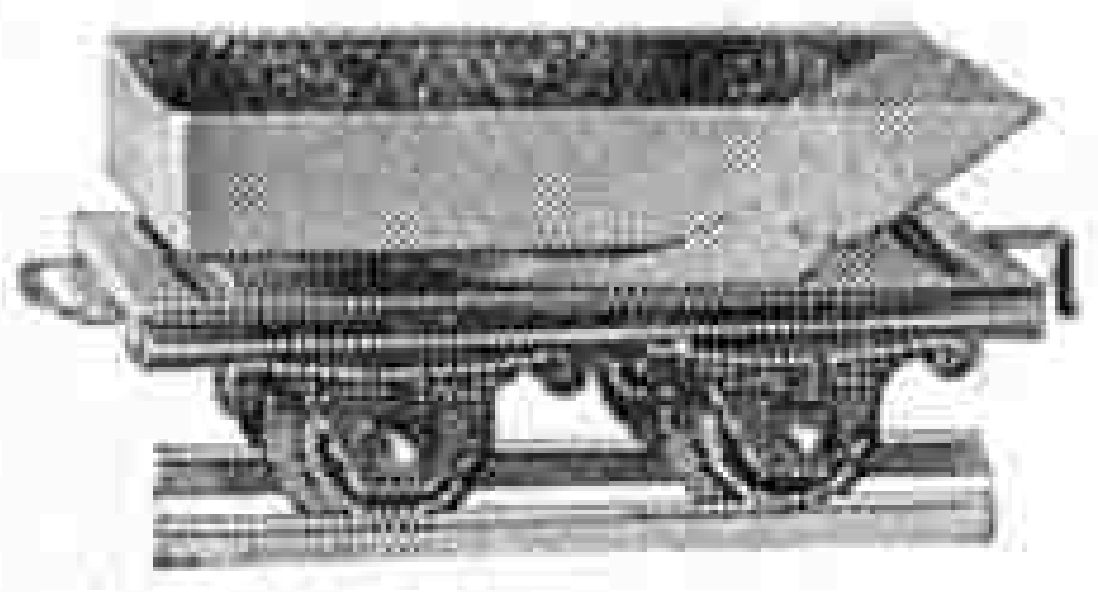

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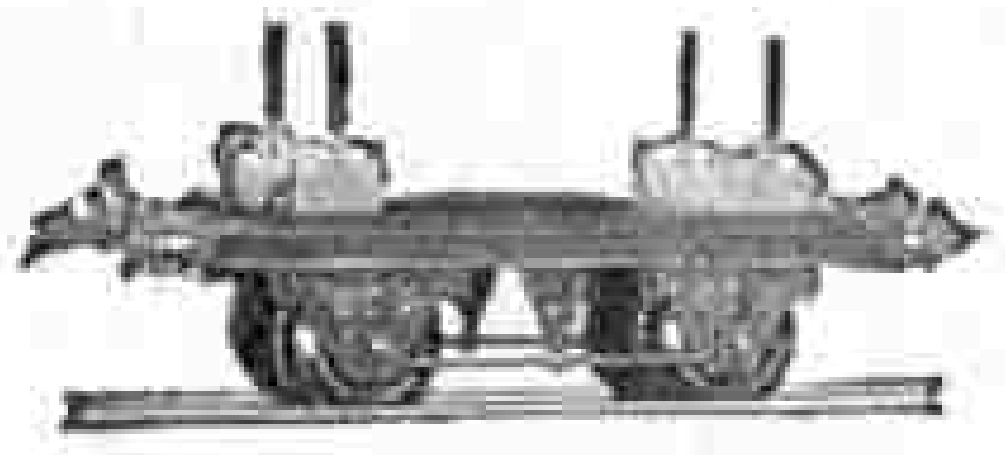

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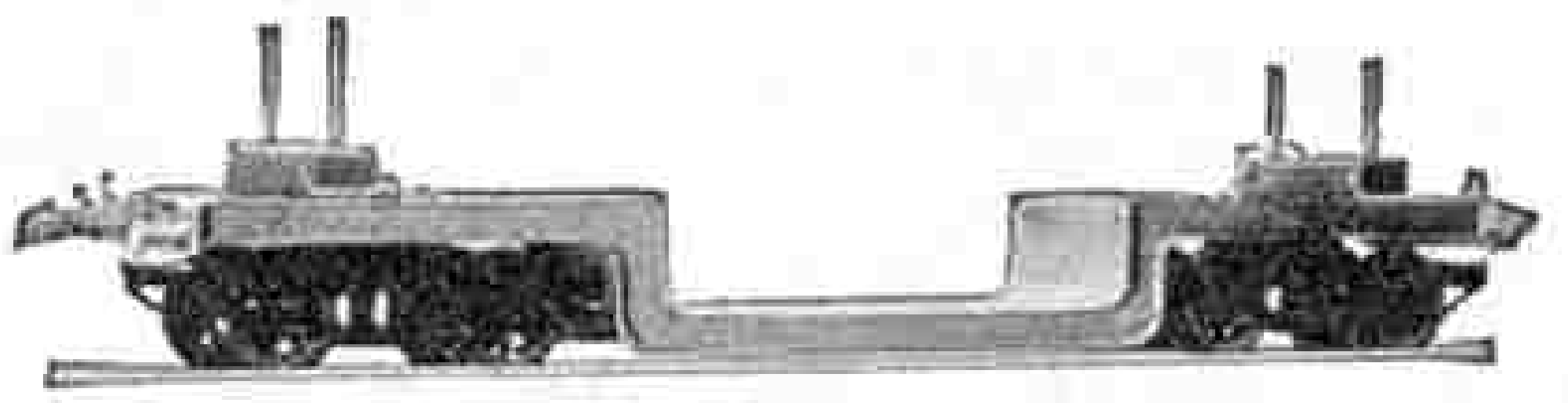

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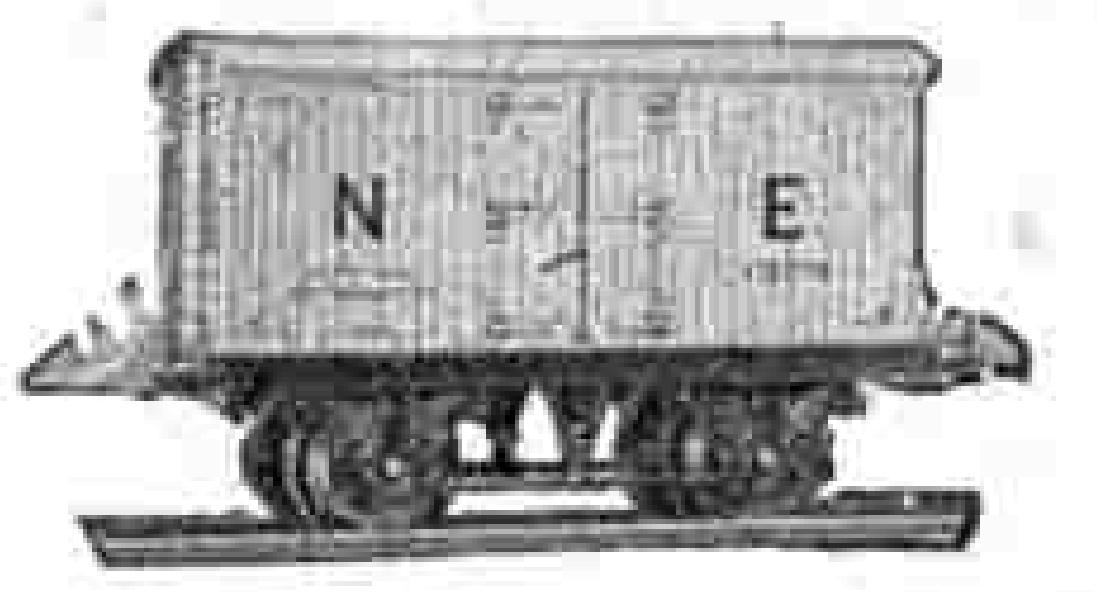

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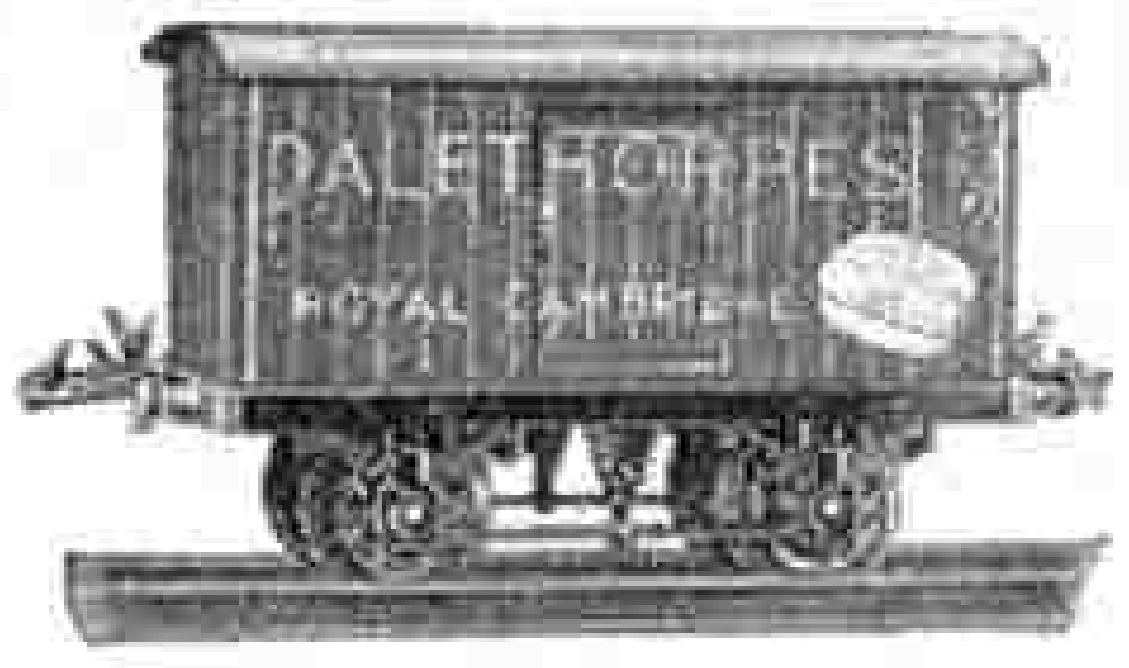

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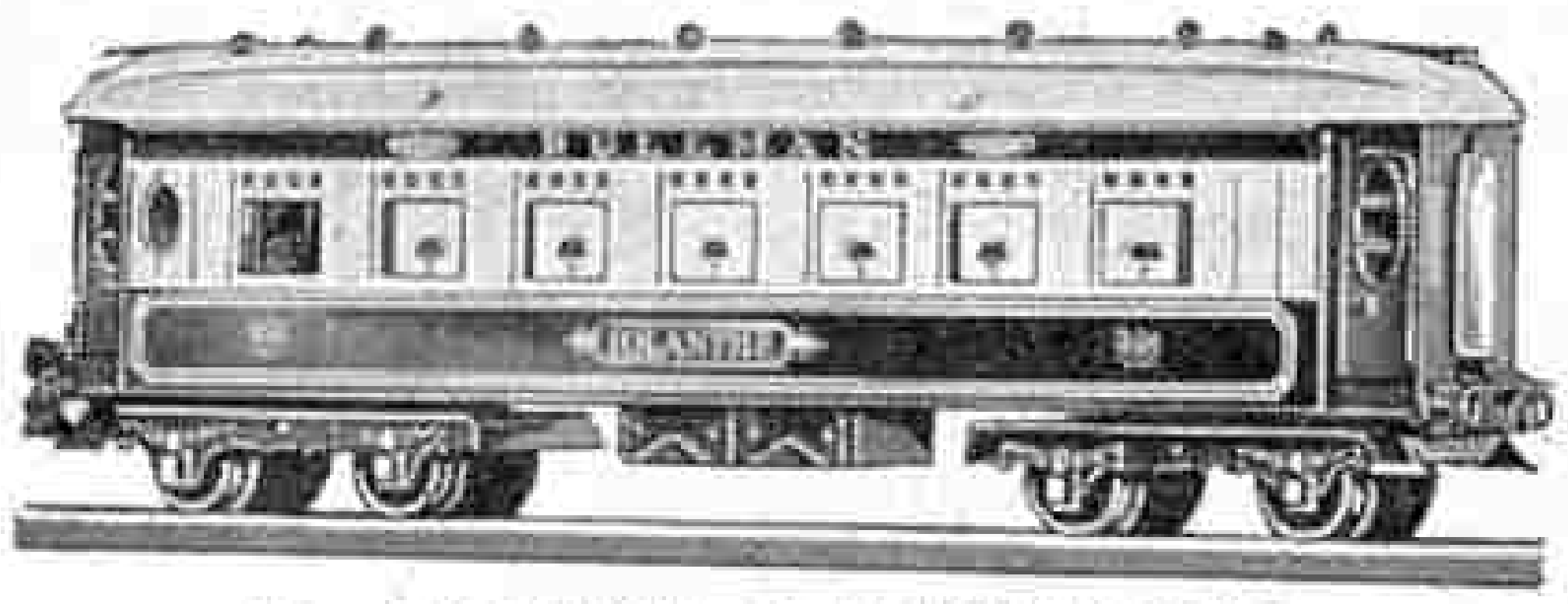

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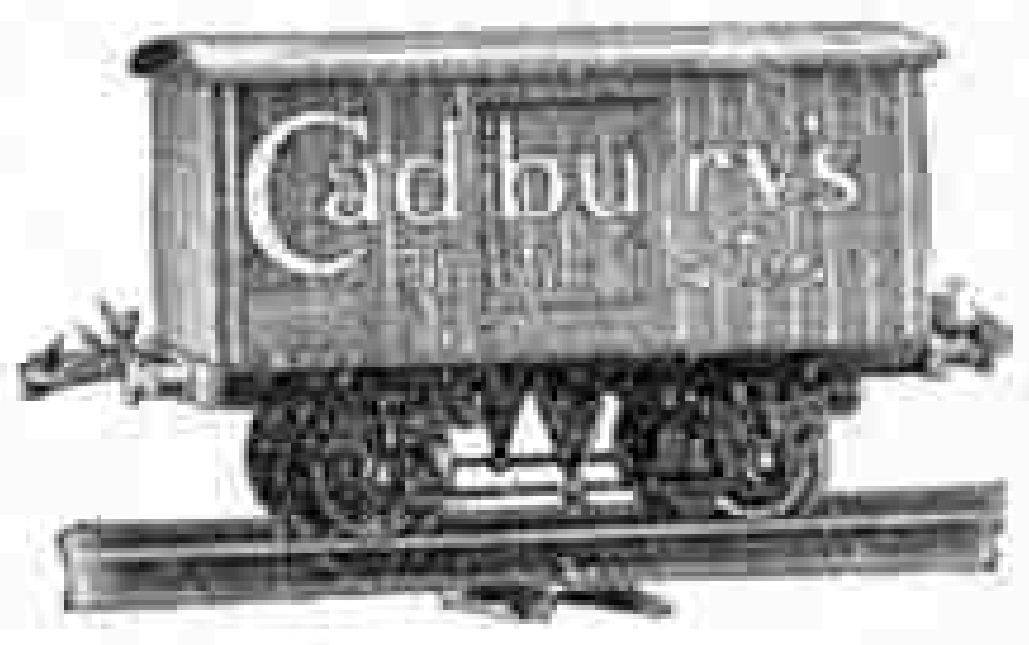

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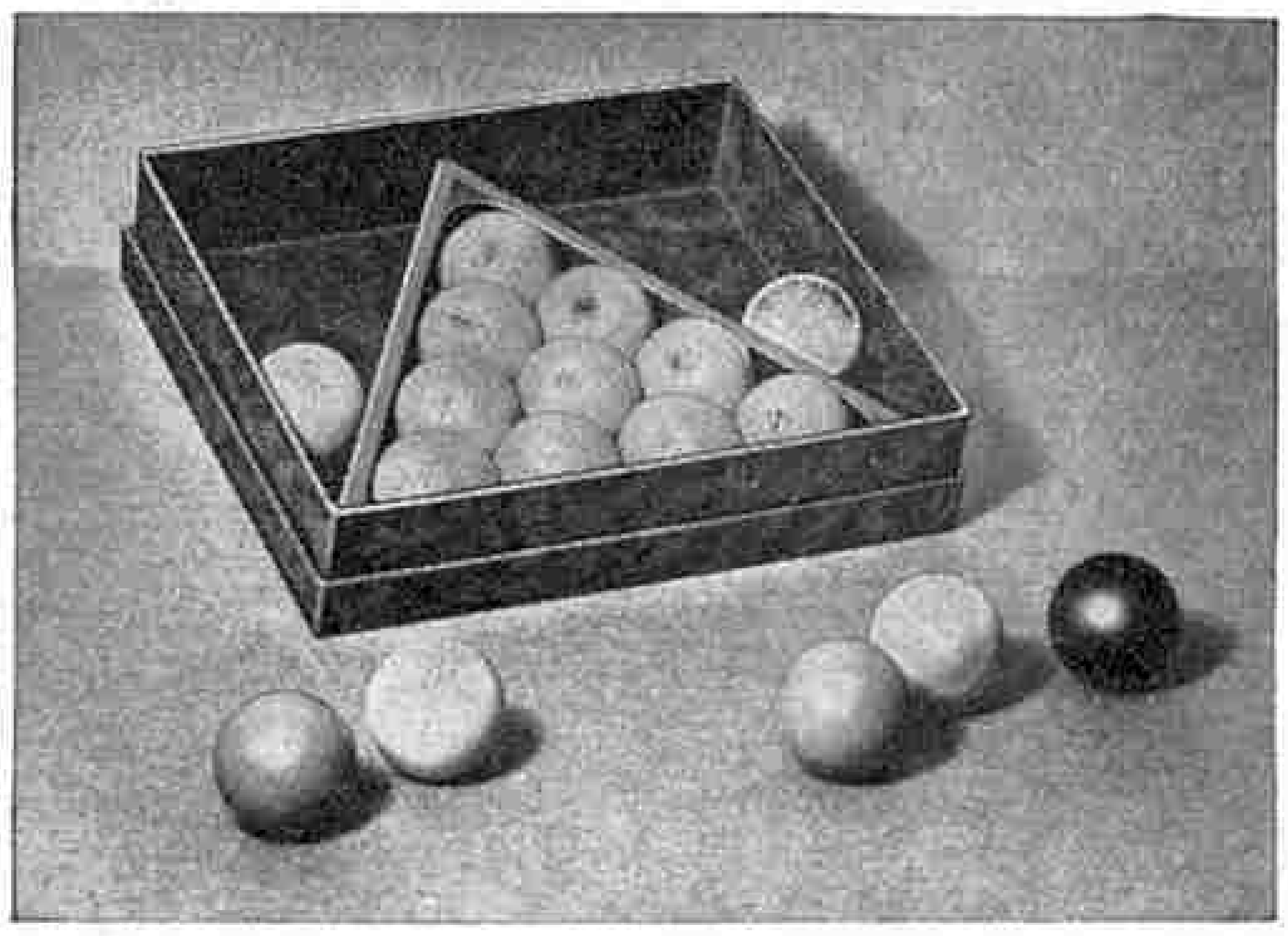

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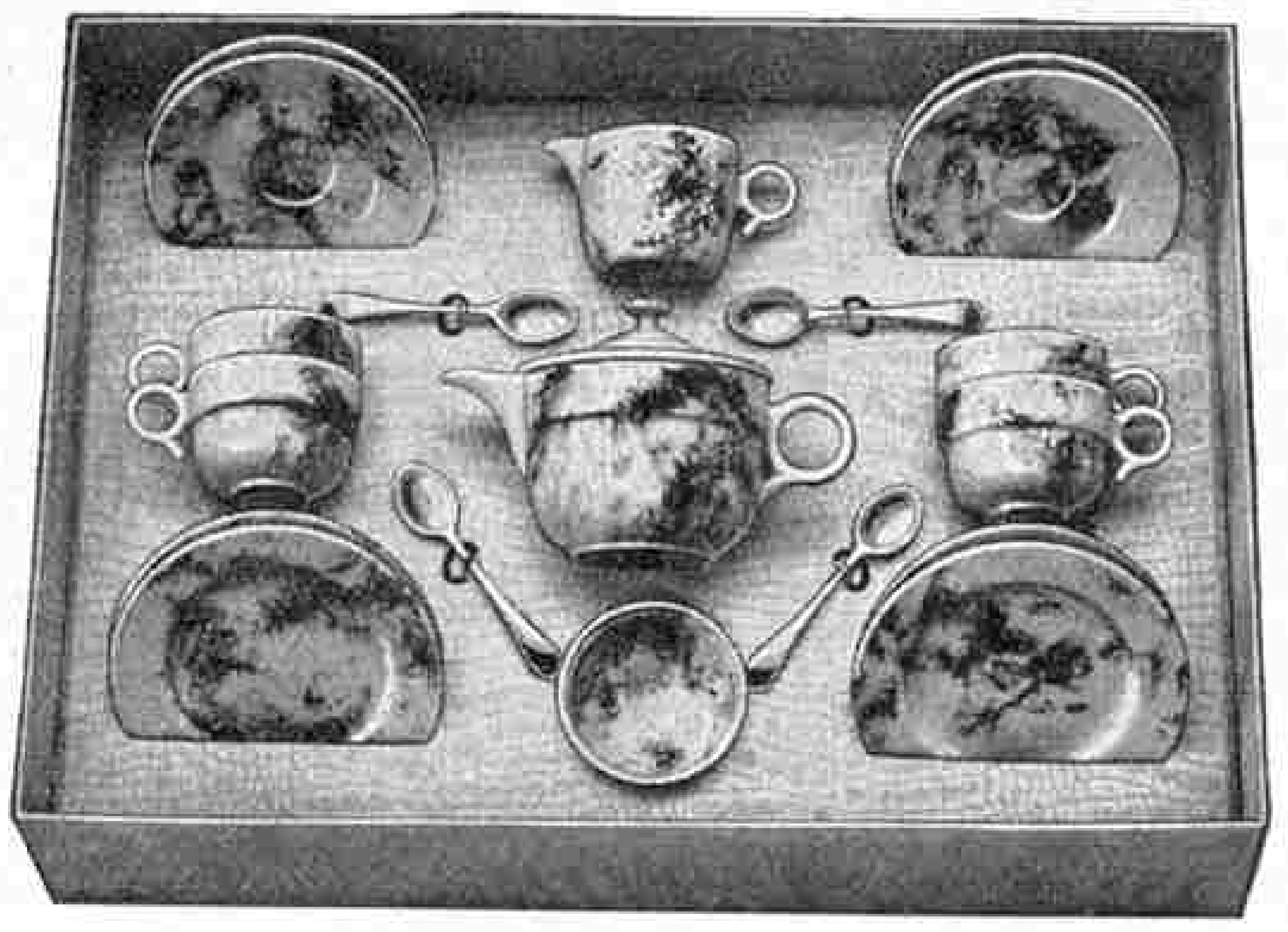

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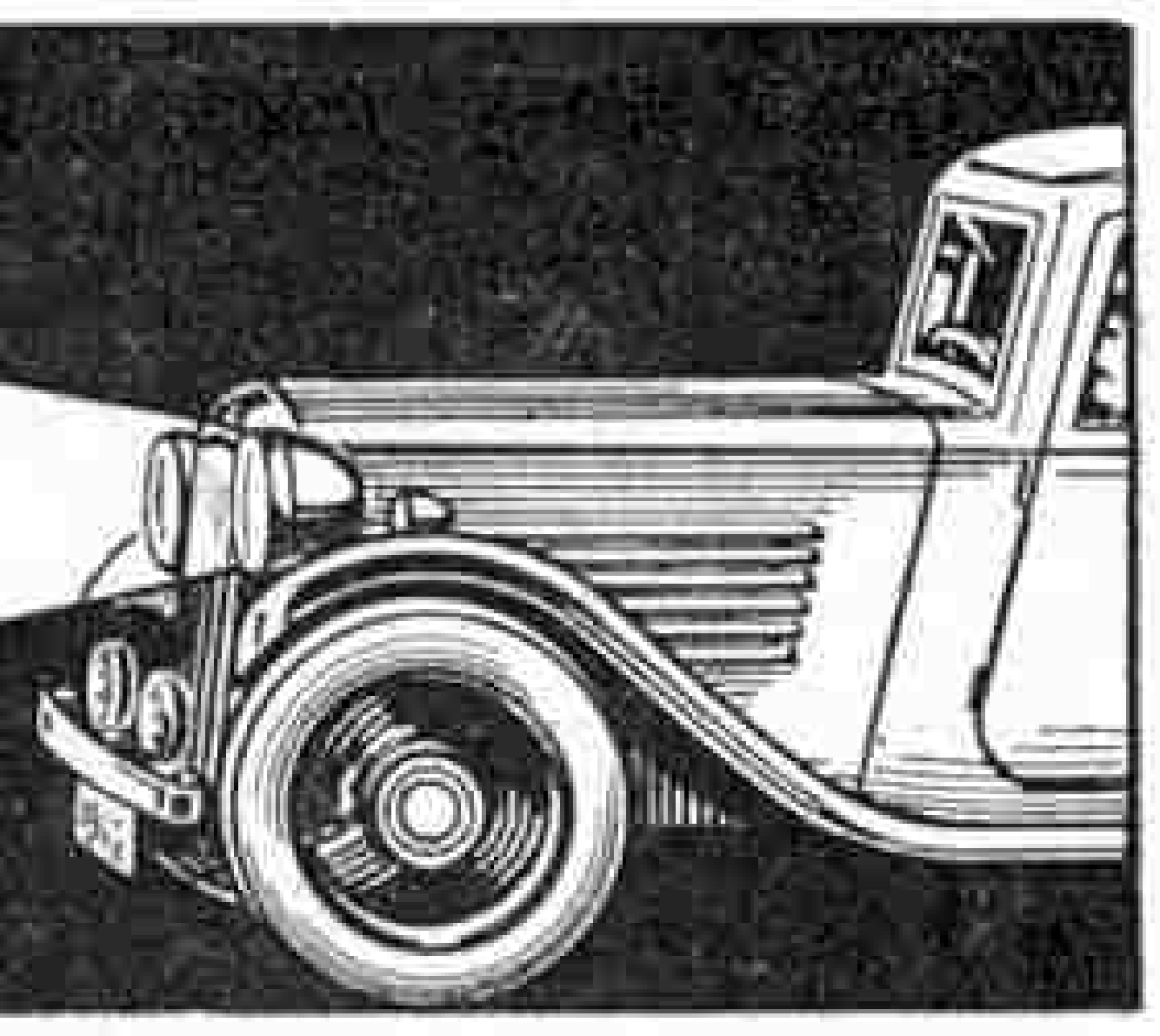

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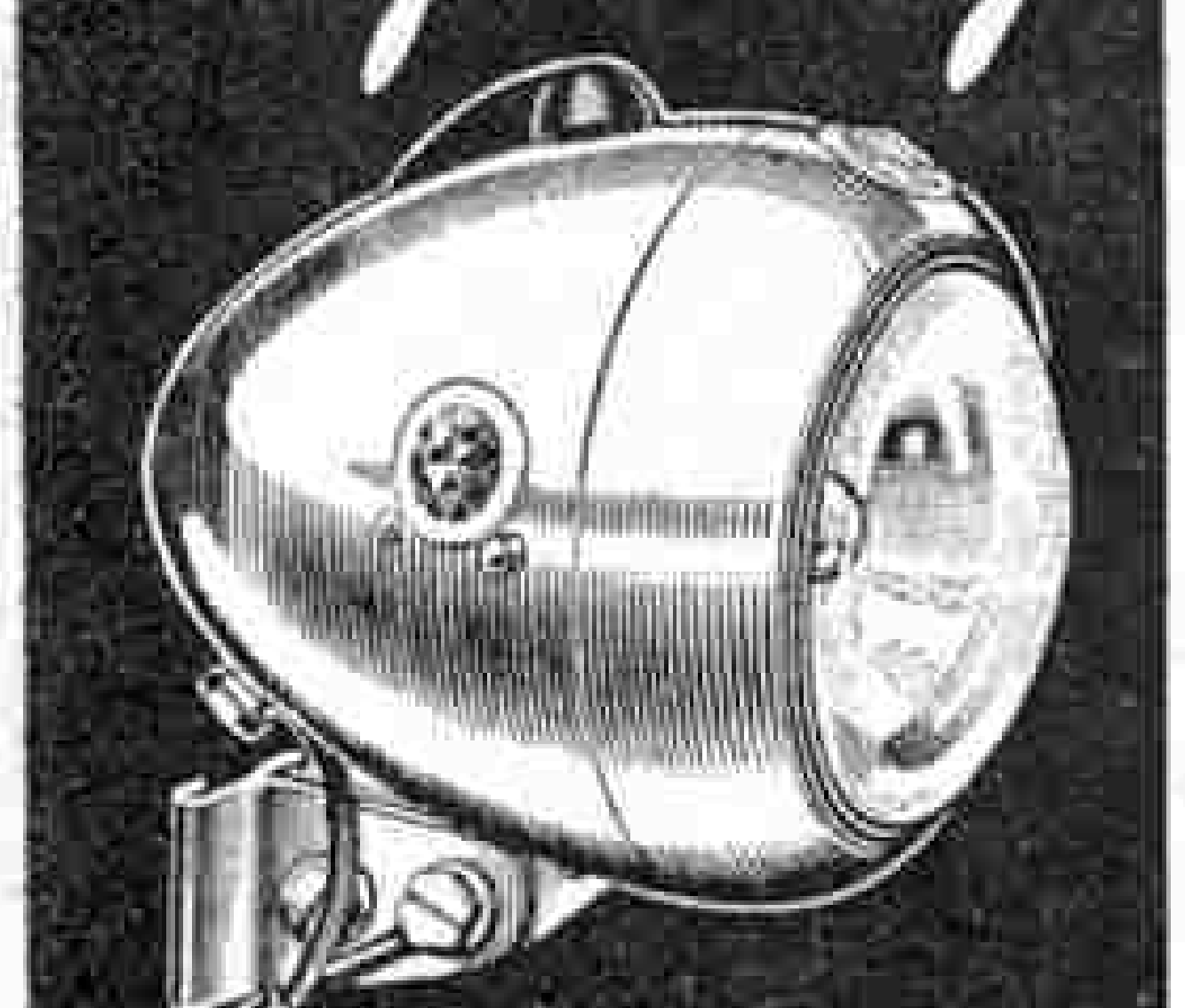

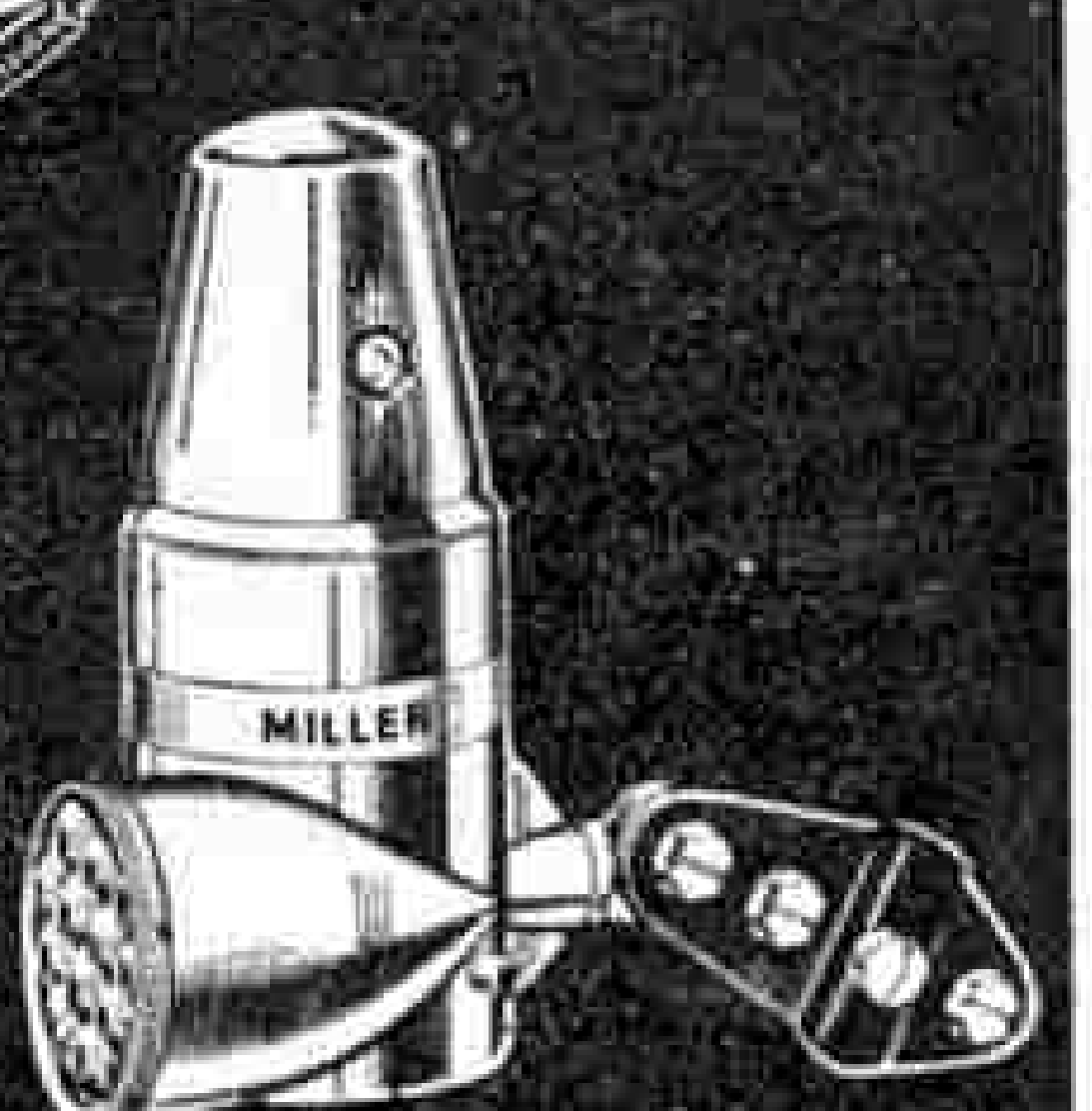

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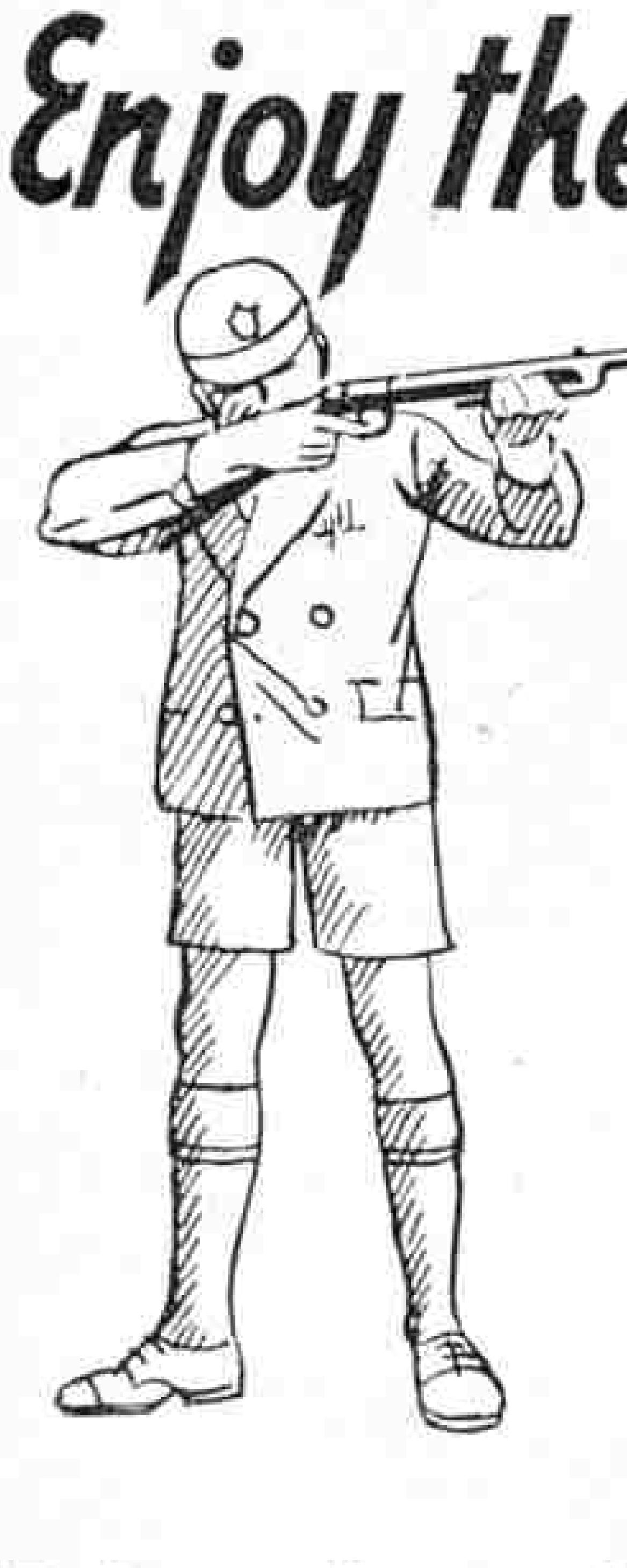

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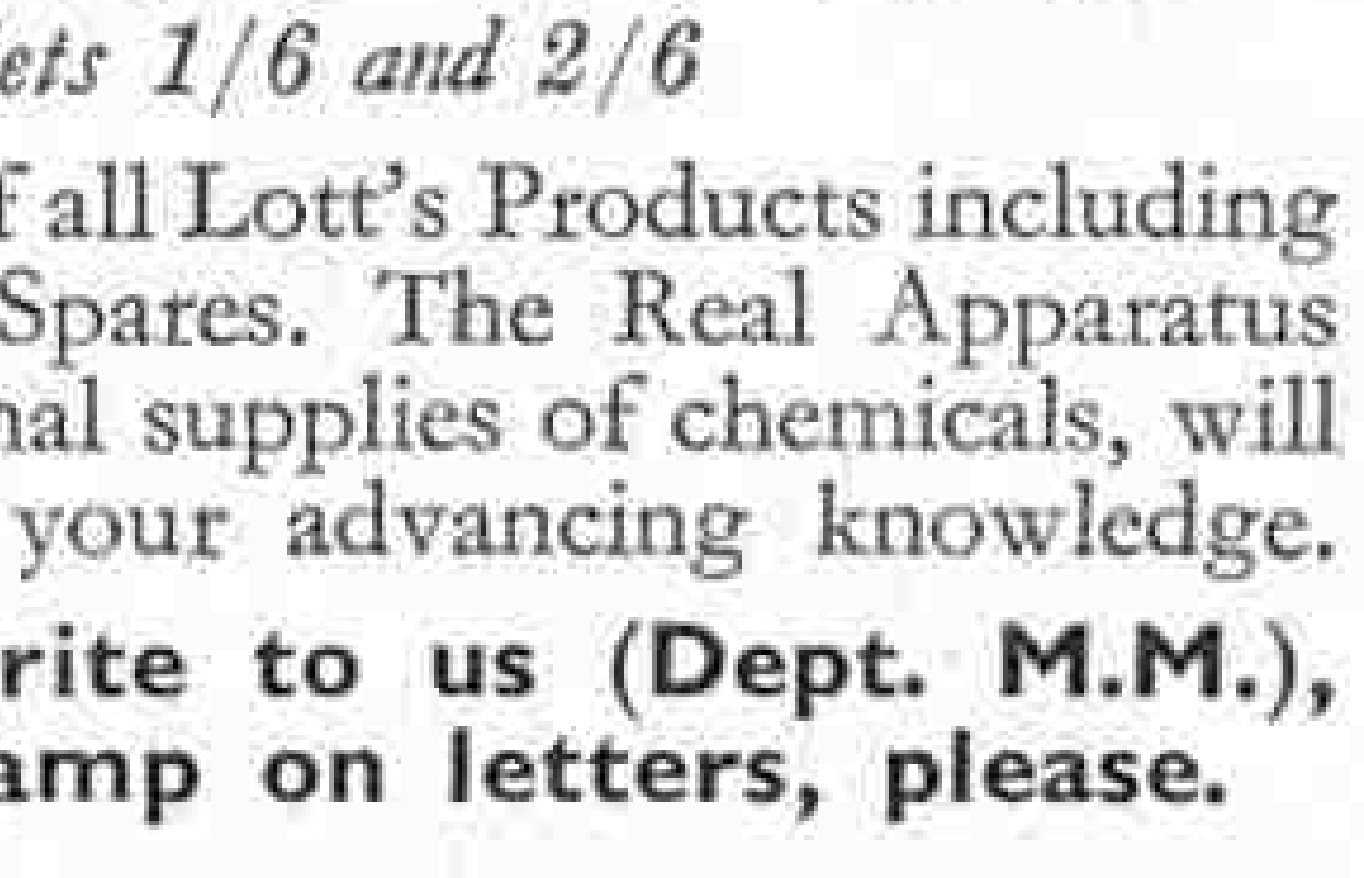

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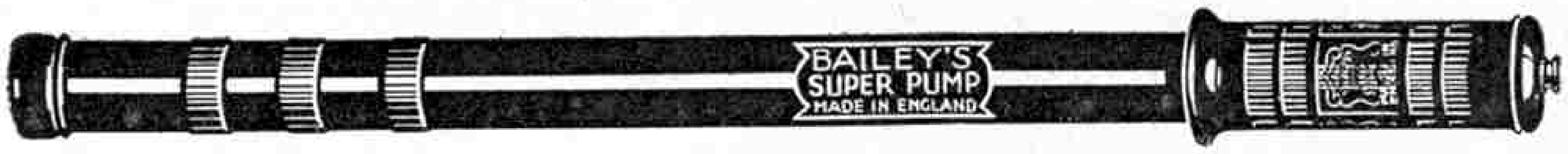

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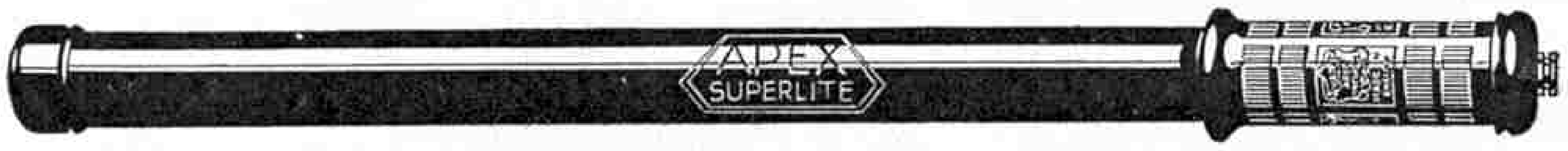

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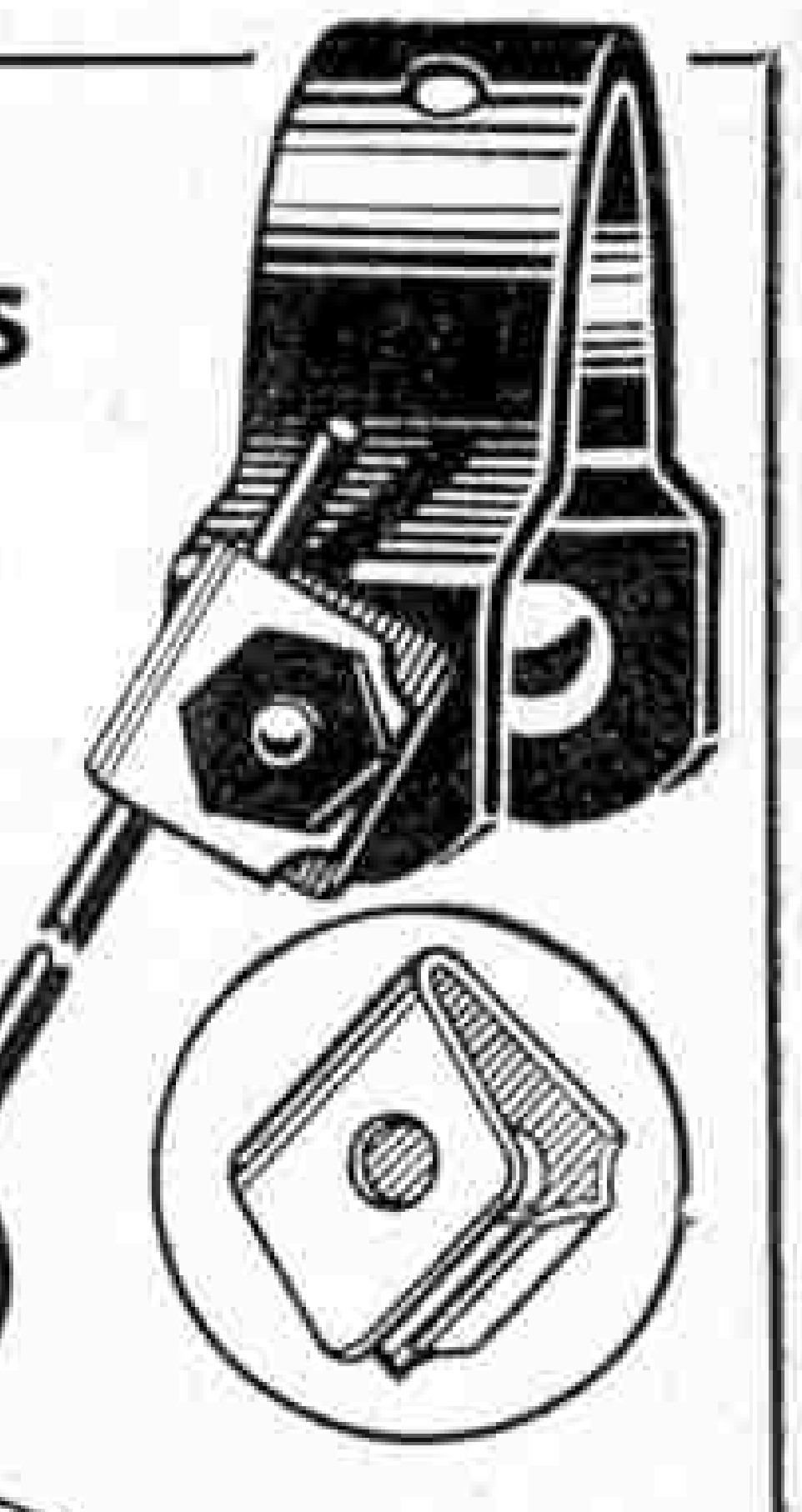

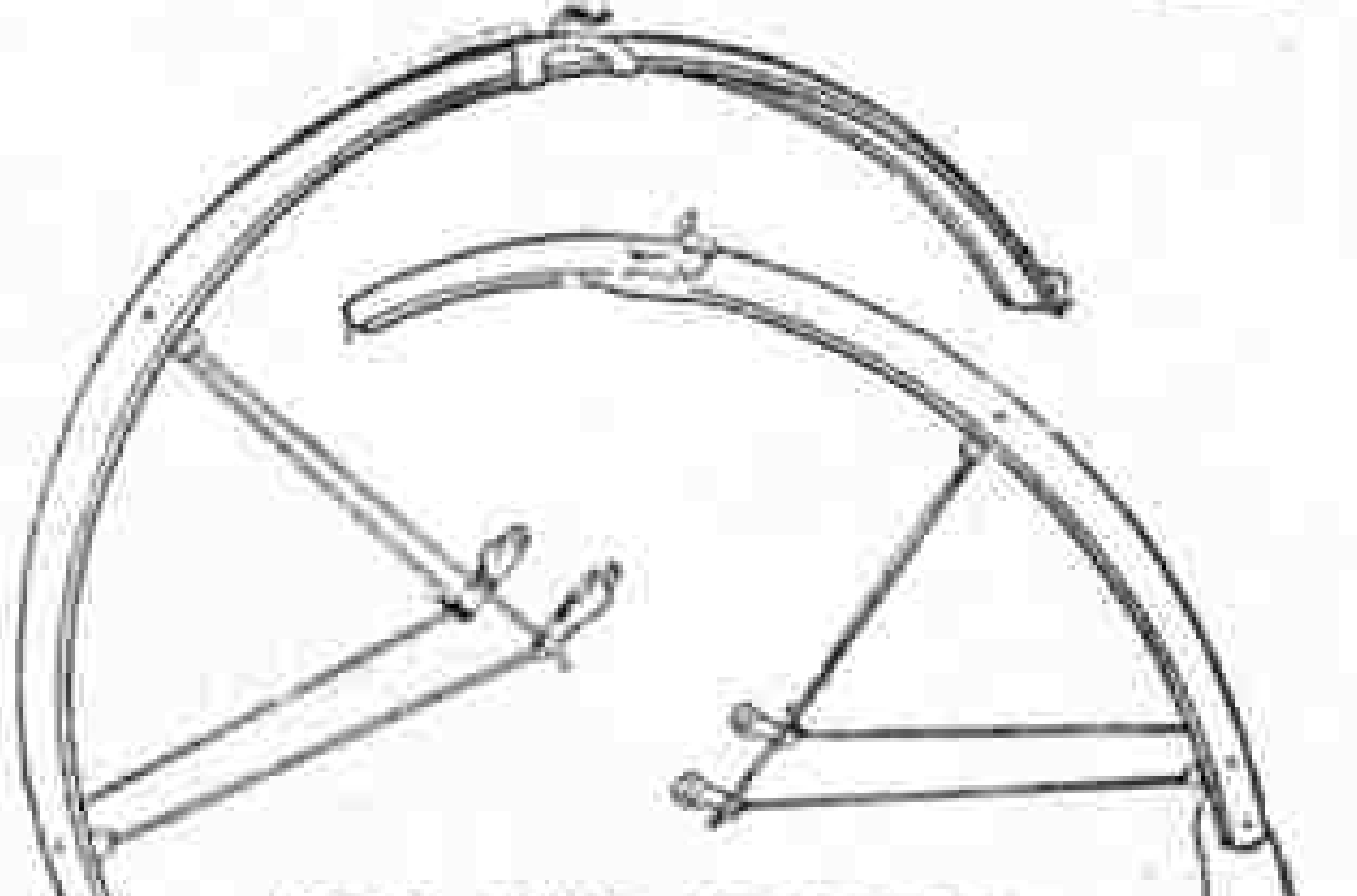

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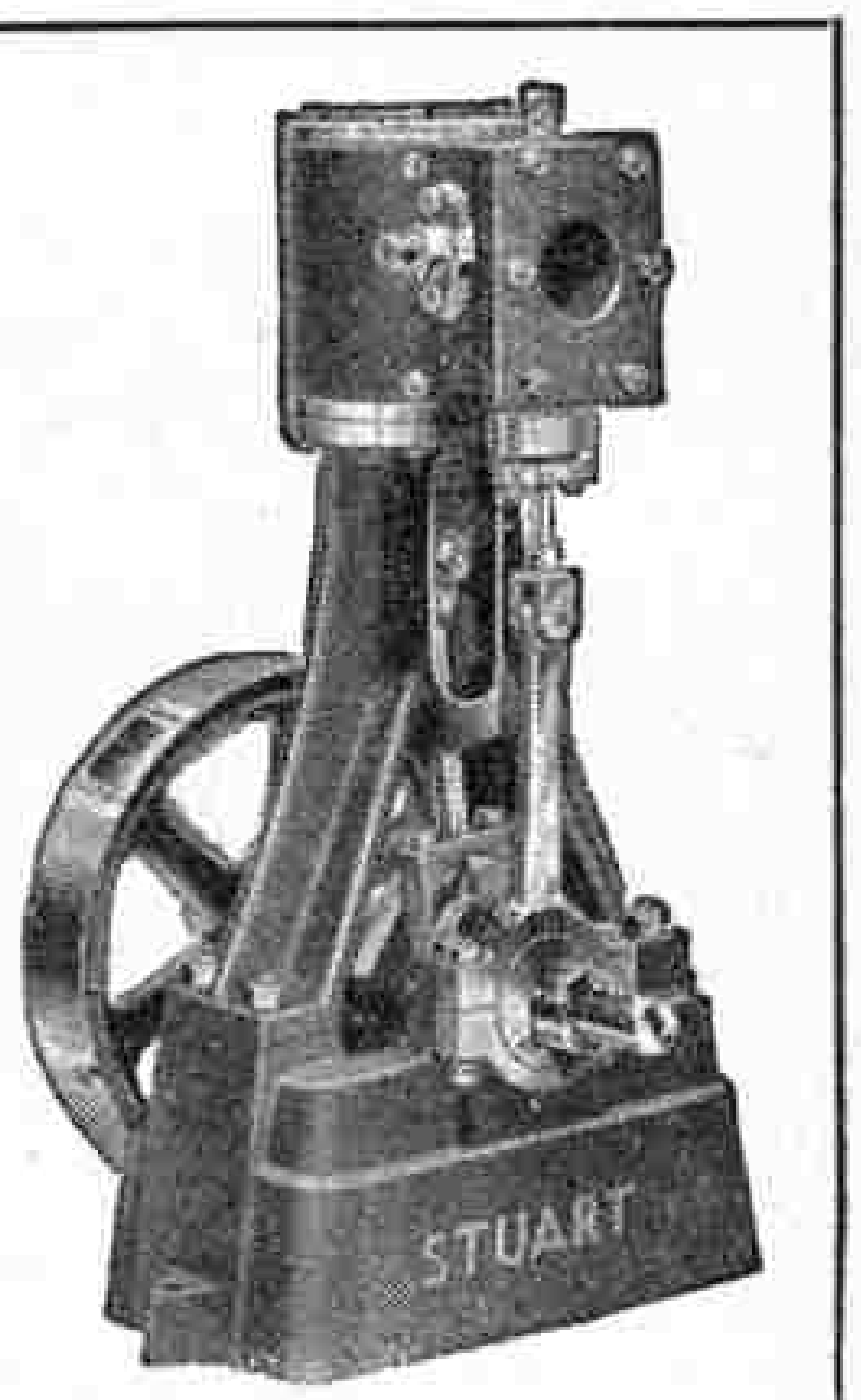

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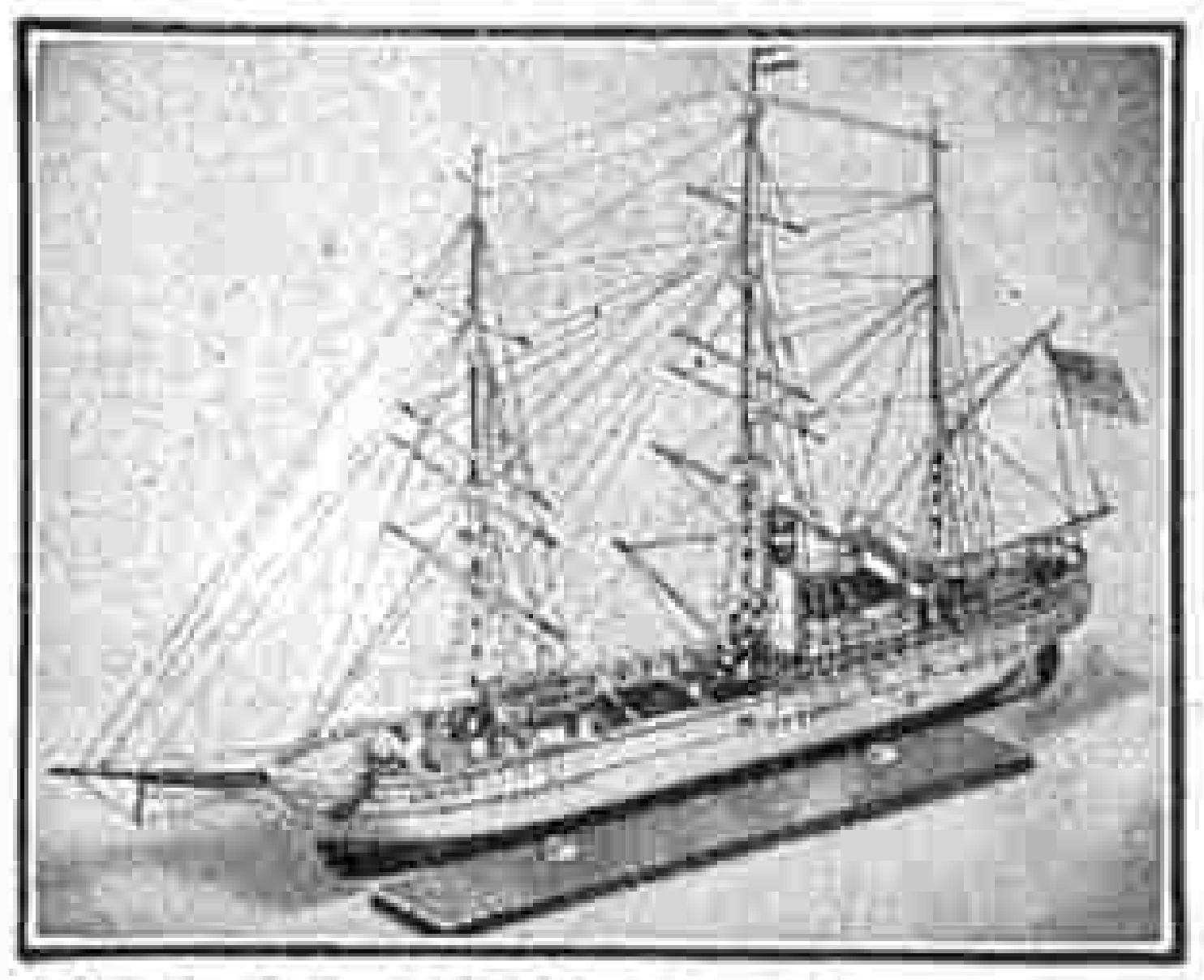

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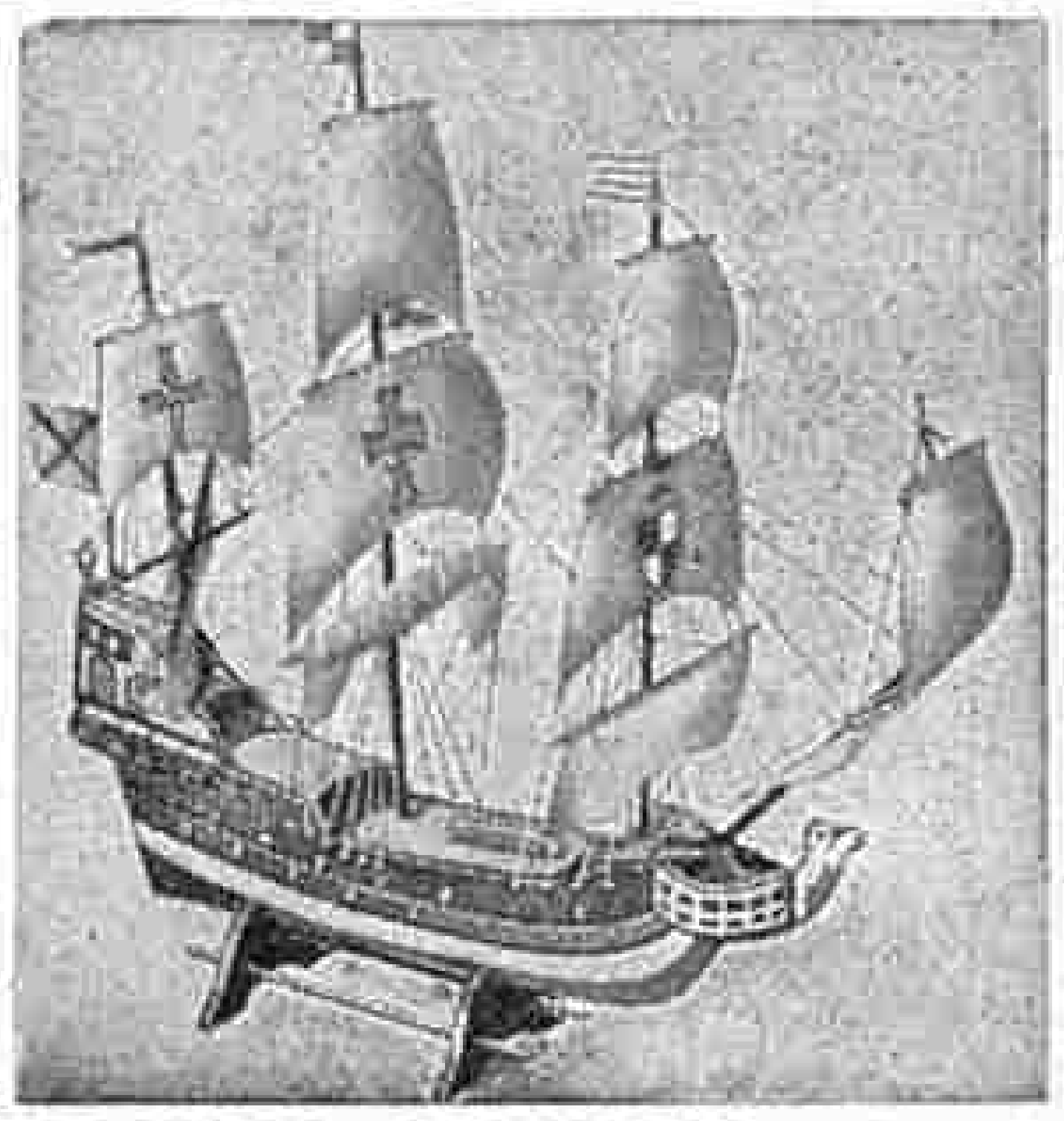

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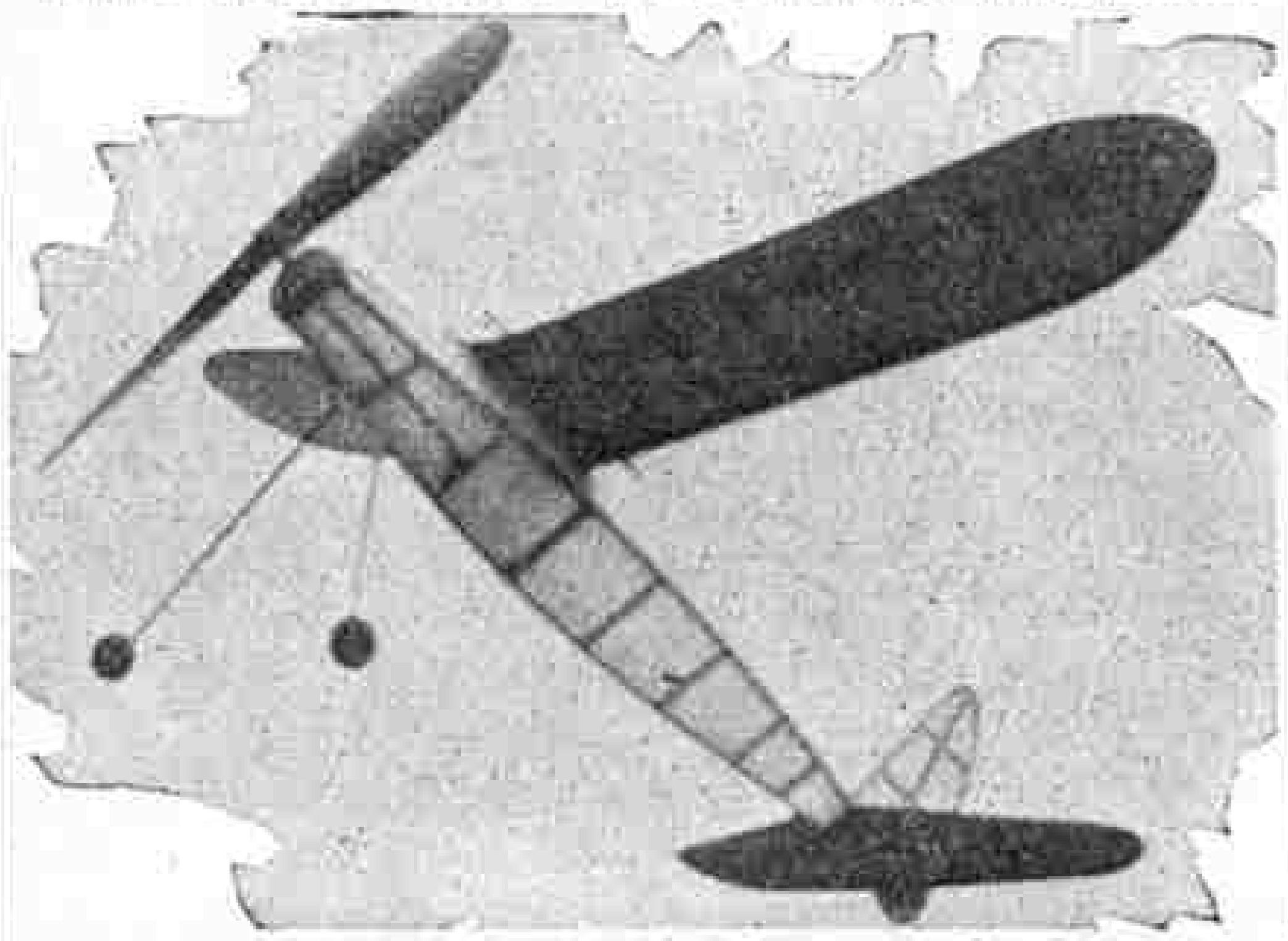

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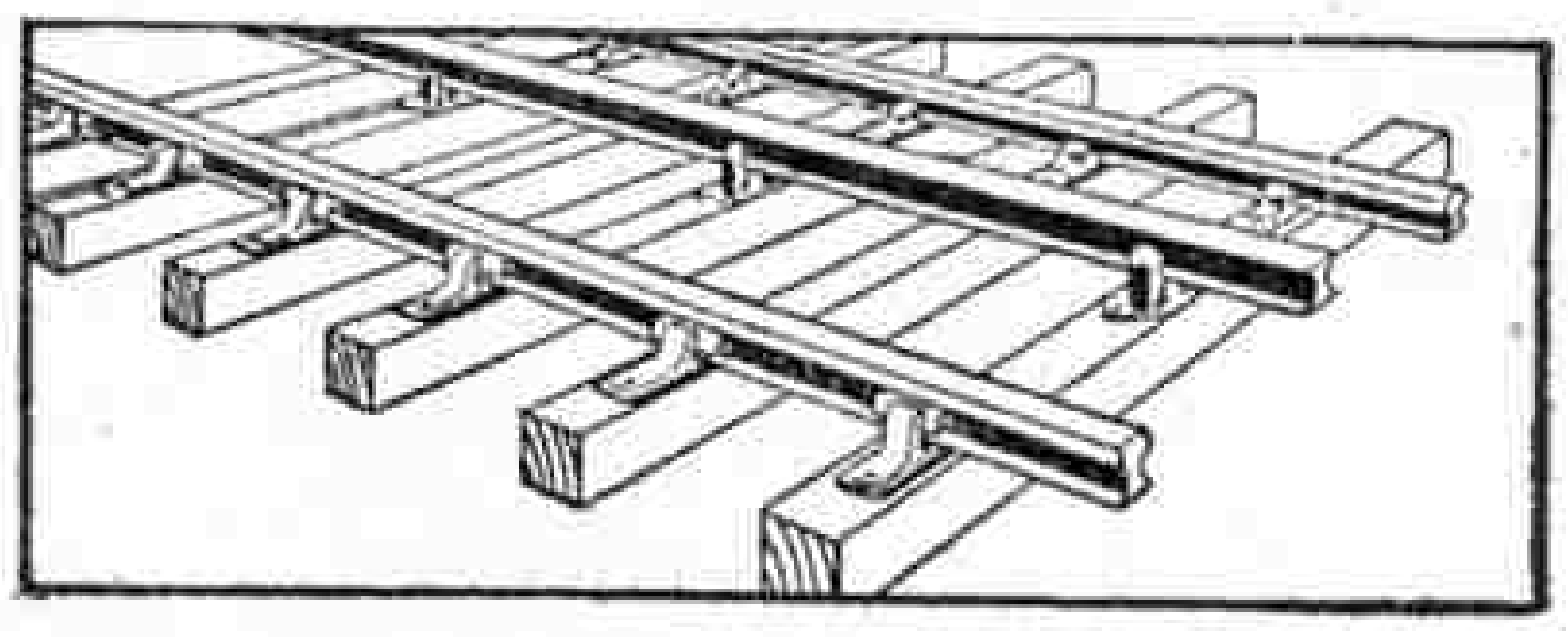

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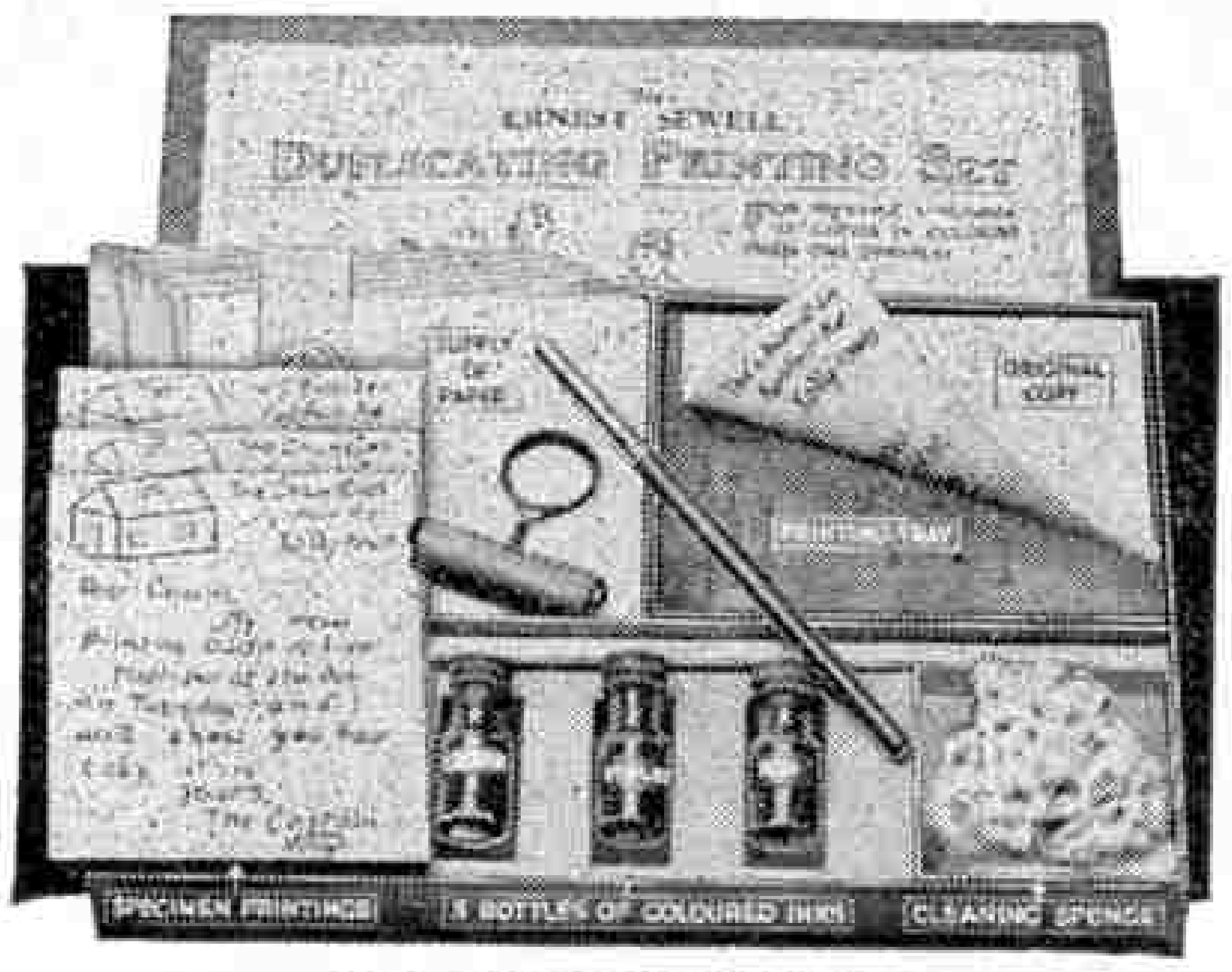

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READERS' SALES

Readers should note that all advertisements of Hornby Trains and other Meccano products included in this column relate to items no longer featured in the catalogue. Advertisements of current products cannot he accepted for this column.

35 "M.M.'s," January 1932–December 1934 (one missing), perfect condition, 10/6 or offers. 1,200 different stamps in album, includes 100 old British, 30/- or offers.—Newton, Fairfield Bury, St. Ives, Hunts.

Sale. Red-Green Meccano, No. 6 Set with extras. Good condition. 45/- or offers.—L. Paulden, Woodvale Road, Knutsford, Cheshire.

Red-Green Meccano, C.W. Motor, Cabinet. Bargain, £2.—Plucknett, Victoria Road, Devizes, Wilts.

Sale. Red-Green Meccano Parts. 40/- or nearest offer. Worth £3/10/-.—P. Franks, 3, Broadwood Cottages, Wood Street, Guildford, Surrey.

For Sale. "M.M.'s," January 1925– December 1935, good condition, £1.—Renault, 5, St. Anns Road, Faversham.

Sale. "Meccano Magazines," October 1931 to October 1933. Good condition. 5/- lot or offers. Pathéscope Kid Cinema and Transformer, as new. Perfect condition. Offers?—Maddock, Albert Road, Trentham, Staffs.

Wanted. Customers for "Kay" Telephone; "Hotspurs" 1-250; Chemicals and Apparatus; and many other good 'toys,' etc. Must sell, so everything cheap. List free from—P. Wiseman, 85, Beehive Lane, Ilford, Essex.

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Chemistry Set. Cost 25/-, accept 15/-.—Appleton, 117 Hurst Road, Erith, Kent.

Wireless Bargains. Pye 2-valve set, 12/6, Burgoyne Three, 17/6, 5-valve portable, 19/6, all with speakers, valves, perfect. Car. paid. Headphones, 2/11.—63, Avenue Approach, Bury St. Edmunds.

A complete Trix Railway for sale. Excellent condition. Write for list.—Robilliard, 60, Callander Road, Catford, London S.E.6.

Sales. Offers wanted for Bassett Lowke Flying Scotsman Clockwork Locomotive and two Duke of York Clockwork Locomotives (cost 30/- each). Also four Bassett-Lowke Steel Clockwork Points at 4/- each. Wooden Locomotive Shed, 23 inches long with electric steel double track. 69 "Meccano Magazines," April 1932 to January 1938—£1 or nearest offer.—Halstead, Fleetwood Road, Thornton, Blackpool.

Four-Roomed Doll's House, 17 × 15 × 11. Furnished. Perfect. 7/6.—Grace, 26, Farrer Road, N.8.

Urgently wanted. Hammerton's "Manners and Customs of Mankind," from page 909 to end, parts or bound.—Yeldham, Banstead Road, Carshalton.

Sale. Collection 3,000 Stamps in Album, 32/6.—Huzzey, 71, Lea Street, Kidderminster.

Sale. "Meccano Magazines," 1928-1931 bound, 1932-1936 complete. Condition perfect. 50/- lot. Postage extra. Will sell separate volumes.—Swingler, 123, Ivor Road, Birmingham 11.

"M.M.," bound volumes, 1927, 1928; unbound 1929-1932. Any offers over carriage accepted.—North, Boundstone, Farnham.

Wanted. Boys' Papers, Cigarette Cards, Coins, Stamps. Some for sale.—Cobb, 3, Scott Street, Dundee, Scotland.

Sale. £4 Red-Green Meccano Parts at 40% cost, new. "M.M.'s," 1930-1935, 14/6. 2 G.W. Locos, 2 L.M.C. Coaches, 25/- lot. Lists—Fraser, 17, Broncksea Road, Northville, Bristol 7.

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Sale. 95/- Red-Green Meccano. 100 "M.M.'s," 1929-1938, two gaps. All excellent condition. Sell separately. Offers?—Rogers, 5, Glenageary Terrace, Dun Laoghaire, Dublin.

Sale. Model Railway, £2, or best offer.—Ratcliffe, The Cottage, Market Drayton.

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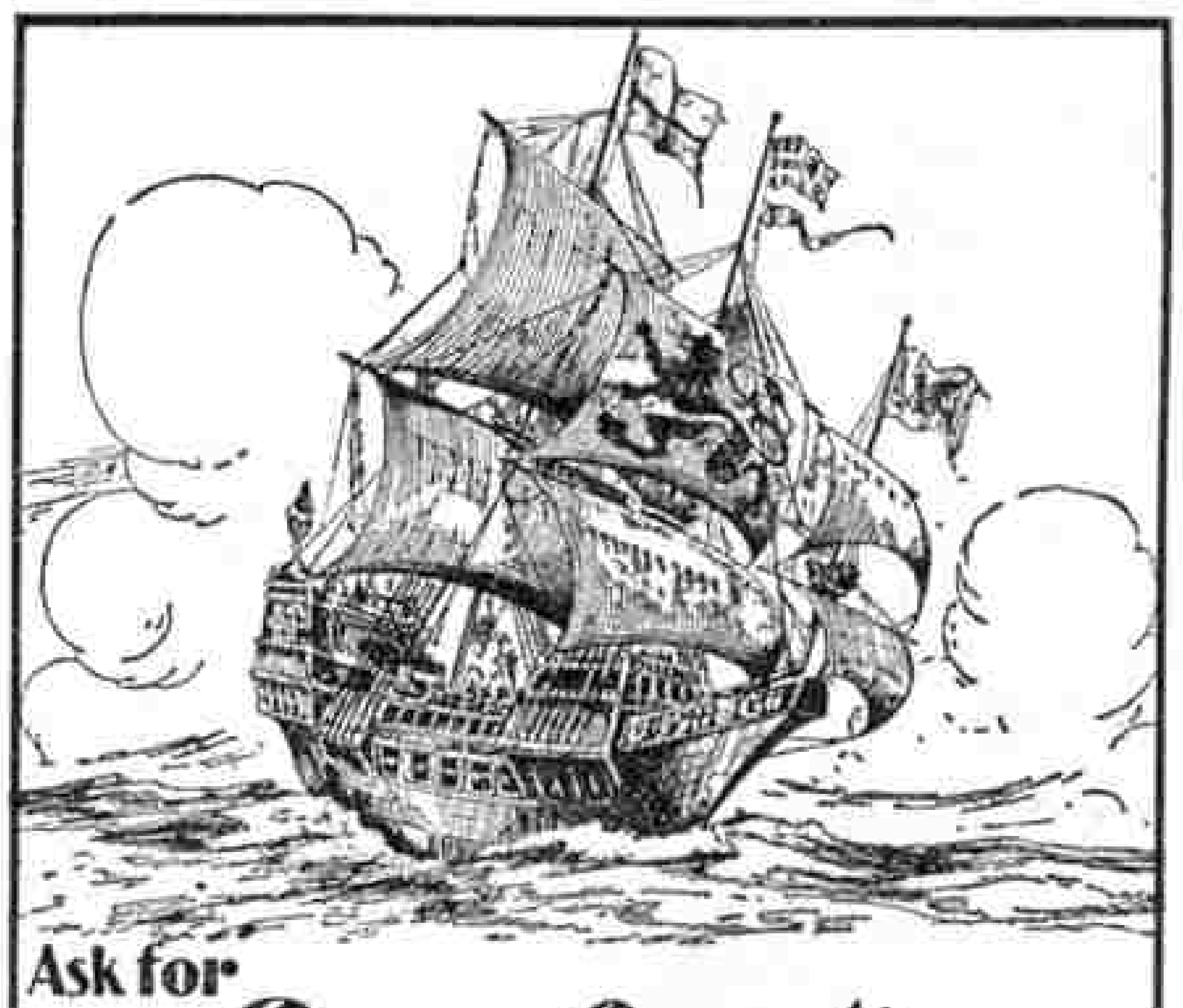

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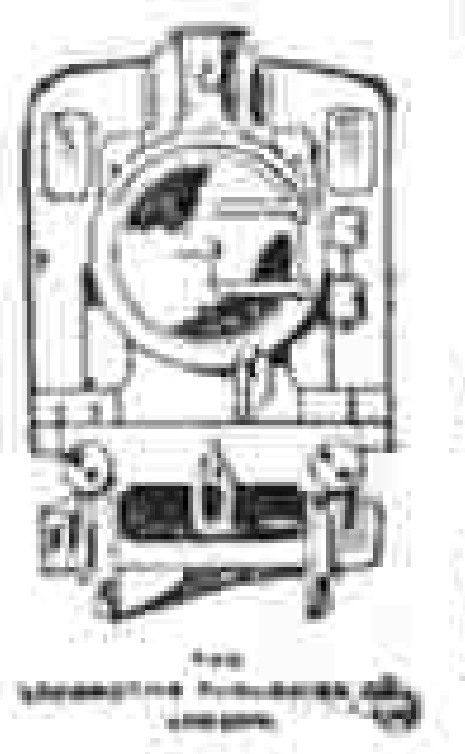

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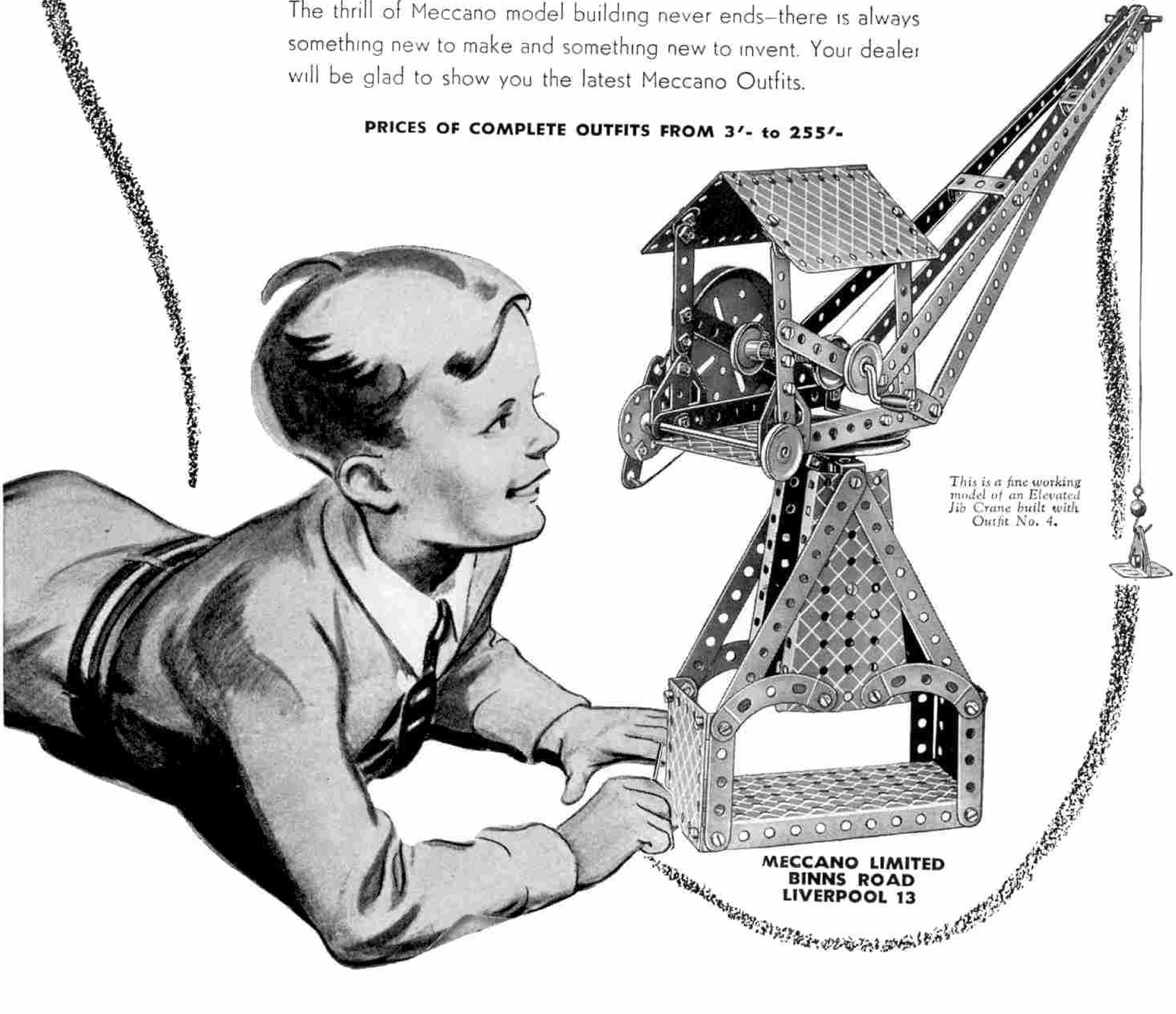

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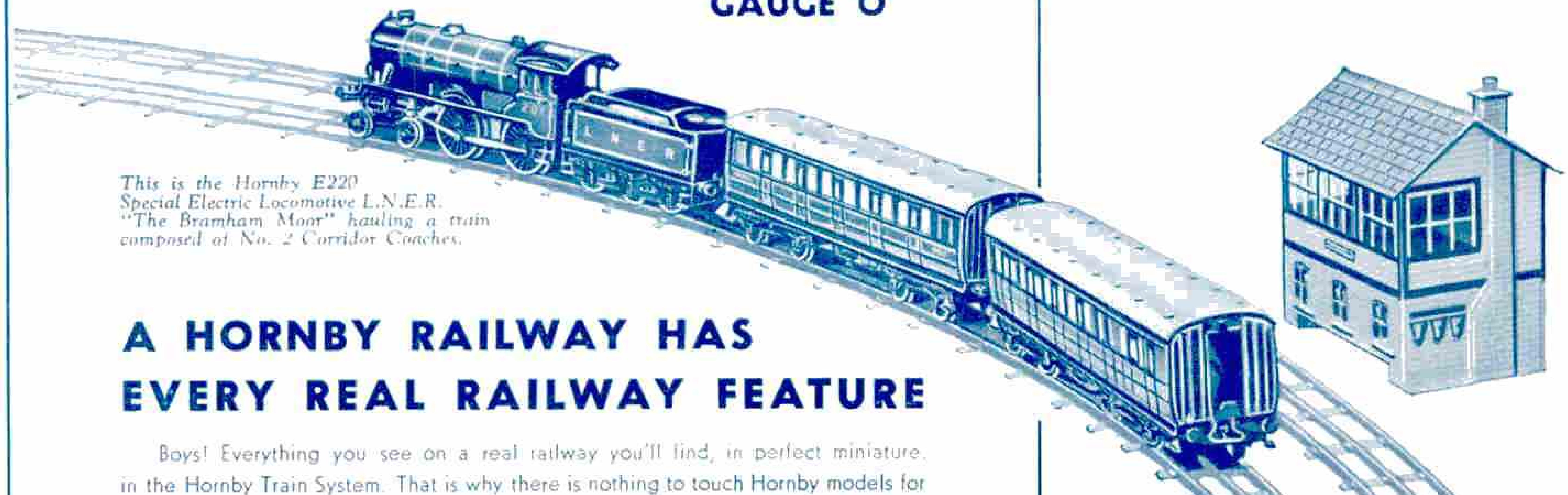

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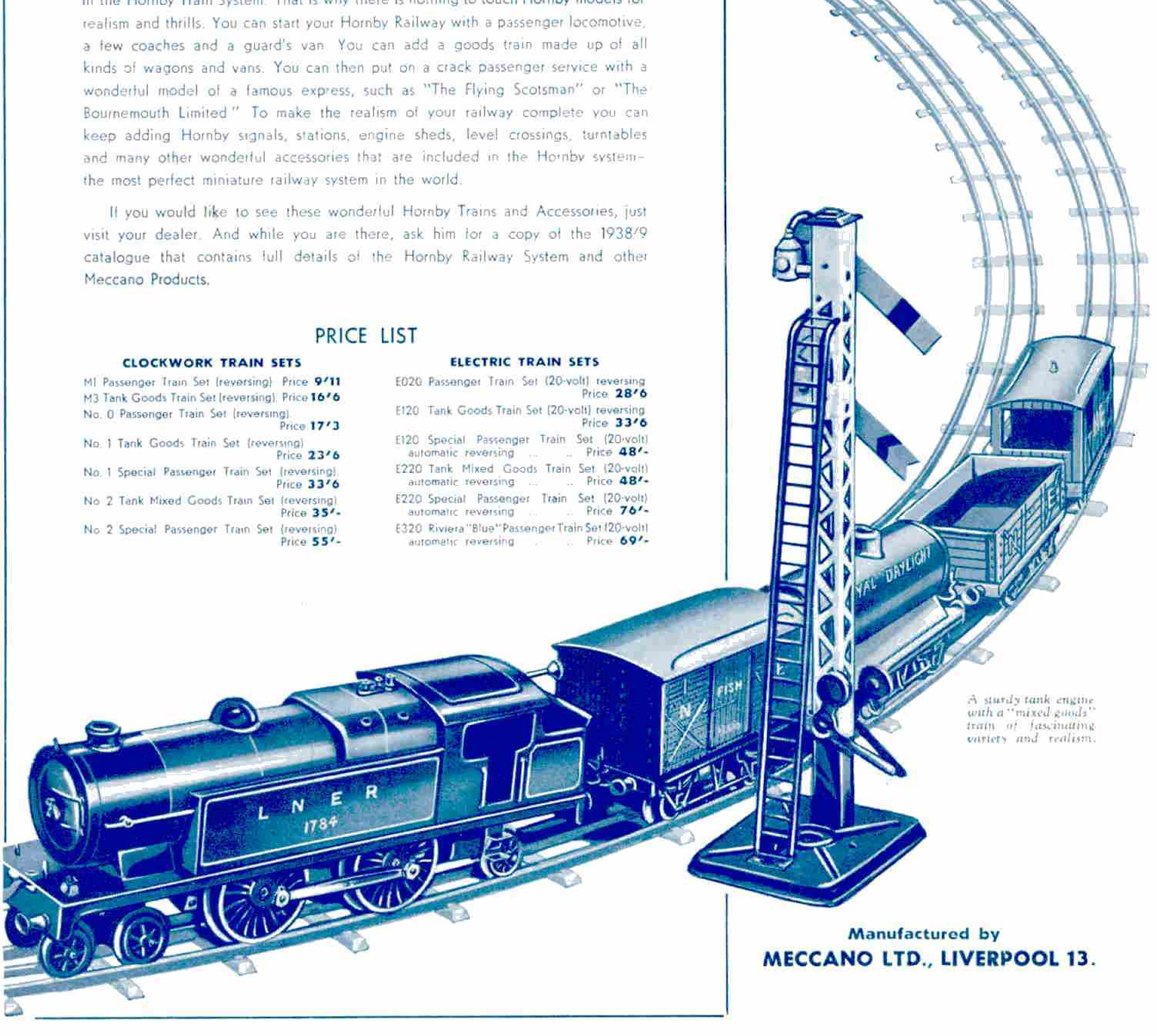

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